HITACHI

PA

No. 0070

SERVICE MANUAL

50FX18B
50FX19K
55FX20B

NTSC

AP62 Chassis

R/C: CLU-417UI

CONTENTS

SAFETY PRECAUTIONS 3
SERVICING PRECAUTIONS 6
TECHNICAL CAUTIONS 9
SPECIFICATIONS 10
CIRCUIT PROTECTION 10
GENERAL INFORMATION 11
CUSTOMER PICTURE AND SOUND ADJUSTMENTS 12
CAUTIONS WHEN CONNECTING/DISCONNECTING THE HV CONNECTOR 15
SERVICE ADJUSTMENTS 16
TROUBLESHOOTING 29
PROTECTION CIRCUIT BLOCK DIAGRAM 36
BLOCK DIAGRAM 37
BASIC CIRCUIT DIAGRAM 39
PRINTED CIRCUIT BOARDS 51
WIRING DIAGRAM 57
EXPLODED VIEW 61
REPLACEMENT PARTS LIST 64

CAUTION: Before servicing this chassis, it is important that the service technician read the "Safety Precaution" and "Product Safety Notices" in this Service Manual.

SAFETY NOTICE

USE ISOLATION TRANSFORMER WHEN SERVICING

Components having special safety characteristics are identified by a ⚠ on the schematics and on the parts list in this Service Data and its supplements and bulletins. Before servicing the chassis, it is important that the service technician read and follow the "Safety Precautions" and "Product Safety Notices" in this Service Manual.

*For continued x-radiation protection, replace picture tube with original type of Hitachi approved equivalent type.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

PROJECTION COLOR TELEVISION

July 1996 HHEA - MANUFACTURING DIVISION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.

Improperly performed repairs can adversely affect the safety and reliability of the product and may void warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING

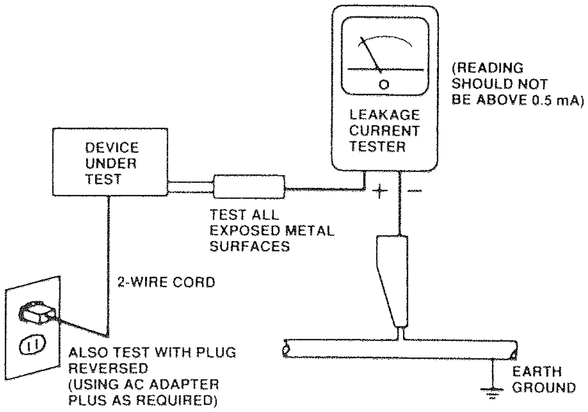
Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health and Safety Code, Section 25249.5).

When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with solder. Also, when soldering do not inhale any smoke or fumes produced.

This television receiver provides display of television closed captioning in accordance with section 5.119 of the FCC rules.

SAFETY PRECAUTIONS

1. Before returning an instrument to the customer, always make a safety check of the entire instrument, including but not limited to the following items:
   a. Be sure that no built-in protective devices are defective and/or have been deleted during servicing. (1) Protective shields are provided on this chassis to protect both the technician and the customer. Correctly replace all missing protective shields, including any removed for servicing convenience. (2) When reinstalling the chassis and/or other assembly in the cabinet, be sure to put back in place all protective devices, including but not limited to, nonmetallic control knobs, insulating fishpapers, adjustment and compartment covers/shields, and isolation resistor/capacitor networks. **Do not operate this instrument or permit it to be operated without all protective devices correctly installed and functioning. Servicers who defeat safety features or fail to perform safety checks may be liable for any resulting damage.**
   b. Be sure that there are no cabinet openings through which an adult or child might be able to insert their fingers and contact a hazardous voltage. Such openings include, but are not limited to (1) spacing between the picture tube and cabinet mask, (2) excessively wide cabinet ventilation slots, and (3) an improperly fitted and/or incorrectly secured cabinet back cover.
   c. **Antenna Cold Check** — With the instrument AC plug removed from any AC source, connect an electrical jumper across the two AC plug prongs. Place the instrument AC switch in the on position. Connect one lead of an ohmmeter to the AC plug prongs tied together and touch the other ohmmeter lead in turn to each tuner antenna input exposed terminal screw and, if applicable, to the coaxial connector. If the measured resistance is less than 1.0 megohms or greater than 5.2 megohms, an abnormality exists that must be corrected before the instrument is returned to the customer. Repeat this test with the instrument AC switch in the off position.
   d. **Leakage Current Hot Check** — With the instrument completely reassembled, plug the AC line cord directly into a 120V AC outlet. (Do not use an isola-tion transformer during this test.) Use a leakage current tester or a metering system that complies with American National Standards Institute (ANSI) C101.0 Leakage Current for Appliances and Underwriters Laboratories (UL) 1410, (50.7). With the instrument AC switch first in the on position and then in the off position, measure from a known earth ground (metal waterpipe, conduit, etc.) to all exposed metal parts of the instrument (antennas, handle bracket, metal cabinet, screw heads, metallic overlays, con-trol shafts, etc.), especially any exposed metal parts that offer an electrical return path to the chassis. Any current measured must not exceed 0.1 milliamps. Reverse the instrument power cord plug in the outlet and repeat test.


(READING SHOULD NOT BE ABOVE 0.5 mA)
0
LEAKAGE CURRENT TESTER
DEVICE UNDER TEST
+
−
TEST ALL EXPOSED METAL SURFACES
2-WIRE CORD
ALSO TEST WITH PLUG REVERSED (USING AC ADAPTER PLUS AS REQUIRED)
EARTH GROUND

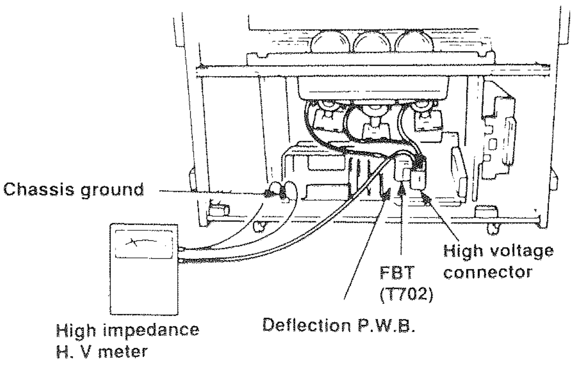
AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE ELIMINATED BEFORE RETURNING THE INSTRUMENT TO THE CUSTOMER OR BEFORE CONNECTING THE ANTENNA OR ACCESSORIES.

   e. **High Voltage** — This receiver is provided with a hold down circuit for clearly indicating that voltage has increased in excess of a predetermined value. Comply with all notes described in this Service Manual regarding this hold down circuit when servicing, so that this hold down circuit may correctly be operated.
   f. **Serviceman Warning** — With minimum contrast and brightness, operating high voltage in this receiver is lower than **31.6kV.** In case any component having influence on high voltage is replaced, confirm that high voltage with minimum contrast and brightness is lower than **31.6kV.**

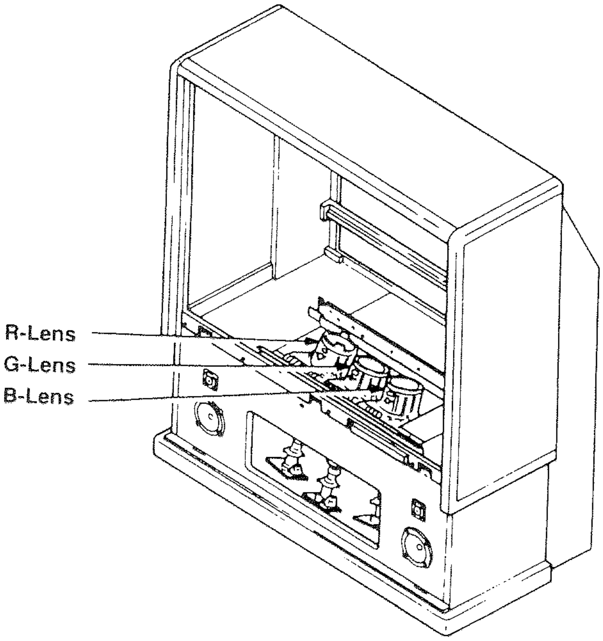
   To measure H.V. use a high impedance H.V. meter. Connect (-) to chassis earth and (+) to the CRT anode button. (See the following connection diagram.)

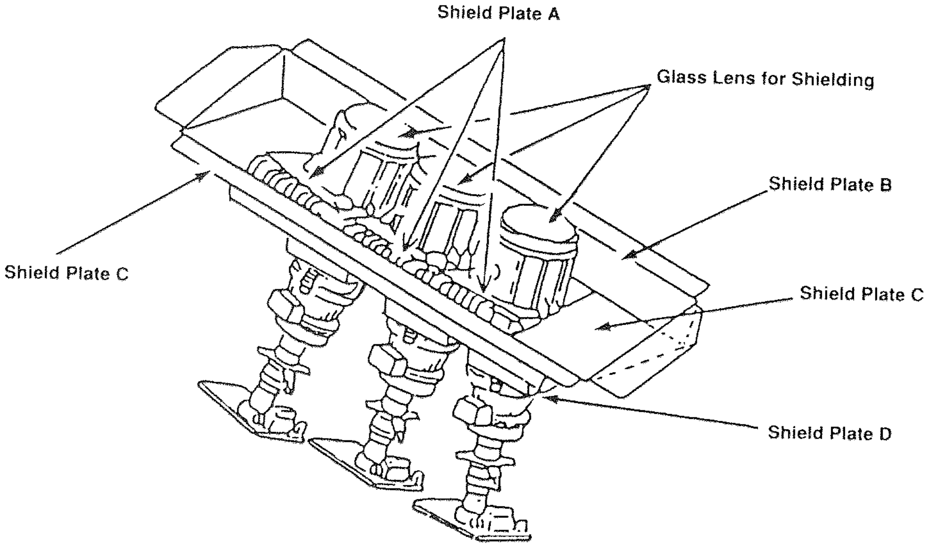
Note: Turn power switch off without fail before the connection to the anode button is made.



g. **X-radiation — TUBE:** The primary source of X radiation in this receiver is the picture tube. The tube utilized for the above mentioned function in this chassis is specially constructed to limit X radiation emissions.
For continued X radiation protection, the replacement tube must be the same type as the original, HITACHI approved type.
When troubleshooting and making test measurements in a receiver with a problem of excessive high voltage, avoid being unnecessarily close to the picture tube and the high voltage component.
Do not operate the chassis longer than is necessary to locate the cause of excessive voltage.

h. **X-Radiation Shield —**
1) This receiver is provided X-ray shield plates for the protection of X-radiation. Do not remove X-ray shield plates A, B, C, or D shown in Fig. 1 unnecessarily, when troubleshooting and/or making test measurements.
2) To prevent X-radiation, after replacement of picture tube and lens, confirm these components to be fixed correctly to bracket and cabinet, and not to be taken off easily.





Detailing X-radiation shield.
Fig. 1

2. Read and comply with all caution and safety-related notes on or inside the receiver cabinet, on the receiver chassis, or on the picture tube.

3. **Design Alteration Warning** — Do not alter or add to the mechanical or electrical design of this TV receiver. Design alterations and additions, including but not limited to, circuit modifications and the addition of items such as auxiliary audio and/or video output connectors, might alter the safety characteristics of this receiver and create a hazard to the user. Any design alterations or additions may void the manufacturer's warranty and may make you, the servicer, responsible for personal injury or property damage resulting therefrom.

4. **Picture Tube Implosion Protection Warning** — The picture tube in this receiver employs integral implosion protection. For continued implosion protection, replace the picture tube only with one of the same type number. Do not remove, install, or otherwise handle the picture tube in any manner without first putting on shatterproof goggles equipped with side shields. People not so equipped must be kept safely away while picture tubes are handled. Keep the picture tube away from your body. Do not handle the picture tube by its neck.

5. **Hot Chassis Warning** — **a.** Some TV receiver chassis are electrically connected directly to one conductor of the AC power cord and may be safety serviced without an isolation transformer only if the AC power plug is inserted so that the chassis is connected to the ground side of the AC power source. To confirm that the AC power plug is inserted correctly, with an AC voltmeter measure between the chassis and a known earth ground. If a voltage reading in excess of 1.0V is obtained, remove and reinsert the AC power plug in the opposite polarity and again measure the voltage potential between the chassis and a known earth ground. **b.** Some TV receiver chassis normally have 85V AC (RMS) between chassis and earth ground regardless of the AC plug polarity. These chassis can be safely serviced only with an isolation transformer inserted in the power line between the receiver and the AC power source, for both personnel and test equipment protection. **c.** Some TV receiver chassis have a secondary ground system in addition to the main chassis ground. This secondary ground system is not isolated from the AC power line. The two ground systems are electrically separated by insulating material that must not be defeated or altered.

6. Observe original lead dress. Take extra care to assure correct lead dress in the following areas: **a.** near sharp edges, **b.** near thermally hot parts — be sure that leads and components do not touch thermally hot parts, **c.** the AC supply, **d.** high voltage and **e.** antenna wiring. Always inspect in all areas for pinched, out-of-plate, or frayed wiring. Do not change spacing between components, and between components and the printed circuit board. Check AC power cord for damage.

7. Components, parts, and/or wiring that appear to have overheated or are otherwise damaged should be replaced with components, parts, or wiring that meet original specifications. Additionally, determine the cause of overheating and/or damage and, if necessary, take corrective action to remove any potential safety hazard.

8. **PRODUCT SAFETY NOTICE** — Many TV electrical and mechanical parts have special safety-related characteristics some of which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified Hitachi service data by shading on schematics and by a (⚠) in the parts list. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part in Hitachi service data parts list might create shock, fire, and/or other hazards. Product safety is under review continuously and new instructions are issued whenever appropriate. For the latest information, always consult the appropriate current Hitachi service literature. A subscription to, or additional copies of Service literature may be obtained at a nominal charge from Hitachi.

SERVICING PRECAUTIONS

CAUTION: Before servicing instruments covered by this service data and its supplements and addenda, read and follow the SAFETY PRECAUTIONS on page 3 of this publication.

NOTE: If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions on page 3 of this publication, always follow the safety precautions. Remember: Safety First.

General Servicing Guidelines

1. Always unplug the instrument AC power cord from the AC power source before:
   a. Removing or reinstalling any component, circuit board, module, or any other instrument assembly.
   b. Disconnecting or reconnecting any instrument electrical plug or other electrical connection.
   c. Connecting a test substitute in parallel with an electrolytic capacitor in the instrument.
   Caution: A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.
   d. Discharging the picture tube anode.
2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc.) equipped with a suitable high voltage probe. Do not test high voltage by "drawing an arc." The H.V. Distribution Box has an internal 400MΩ resistor (bleeder resistor) connected from the high voltage to ground. After power is removed from the instrument the high voltage will discharge through the high voltage bleeder resistor. If the tubes have high voltage after power is removed, then the bleeder resistor is defective or the bleeder ground is disconnected.
3. Discharge the picture tube's anode at any of the R, G, or B outputs on the High Voltage distribution box only by (a) first connecting one end of an insulated clip lead to the degaussing or kine aquadag grounding system shield at the point where the picture tube socket ground lead is connected, and then (b) touch the other end of the insulated clip lead to the picture tube high voltage distribution box R, G, or B output, using an insulating handle to avoid personal contact with high voltage.
4. Do not spray chemical on or near this instrument or any of its assemblies.
5. Unless specified otherwise in these service data, clean electrical contacts by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable nonabrasive applicator: 10% (by volume) Acetone and 90% (by volume) isopropyl alcohol (90%-99% strength). **Caution:** This is a flammable mixture. Unless specified otherwise in these service data, lubrication of contacts is not required.
6. Do not defeat any plug/socket B+ voltage interlocks with which instruments covered by this service data might be equipped.
7. Do not apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
8. Always connect the test instrument ground lead to the appropriate instrument chassis ground before connecting the test instrument positive lead. Always remove the test instrument ground lead last.
9. Use with this instrument only the test fixtures specified in this service data.
   CAUTION: Do not connect the test fixture ground strap to any heatsink in this instrument.

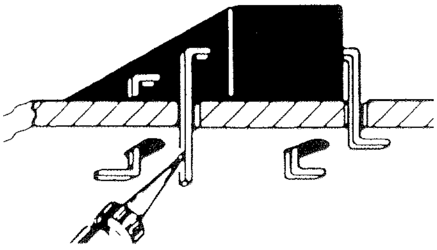
Electrostatically Sensitive (ES) Devices

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static type solder removal device Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material.)
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
   CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

General Soldering Guidelines

1. Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range 500°F to 600°F.
2. Use an appropriate gauge of resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron tip clean and well tinned.
4. Thoroughly clean the surfaces to be soldered. Use a small wire-bristle (0.5 inch or 1.25 cm) brush with a metal handle. Do not use freon-propelled spray-on cleaners.
5. Use the following unsoldering technique.
   a. Allow the soldering iron tip to reach normal temperature (500°F to 600°F).
   b. Heat the component lead until the solder melts. Quickly draw away the melted solder with an anti-static, suction-type solder removal device or with solder braid.
   CAUTION: Work quickly to avoid overheating the circuit board printed foil.
6. Use the following soldering technique.
   a. Allow the soldering iron tip to reach normal temperature (500°F to 600°F).
   b. First, hold the soldering iron tip and solder strand against the component lead until the solder melts.
   c. Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.
   CAUTION: Work quickly to avoid overheating the circuit board printed foil or components.
   d. Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.



Use Soldering Iron to Pry Leads

IC Removal/Replacement

Some Hitachi unitized chassis circuit boards have slotted holes (oblong) through which the IC leads are inserted and then bent flat against the circuit foil. When holes are the slotted type, the following technique should be used to remove and replace the IC. When working with boards using the familiar round hole, use the standard technique as outlined in paragraphs 5 and 6 above.

Removal

1. Desolder and straighten each IC lead in one operation by gently prying up on the lead with the soldering iron tip as the solder melts.
2. Draw away the melted solder with an anti-static suction-type solder removal device (or with solder braid) before removing the IC.

Replacement

1. Carefully insert the replacement IC in the circuit board.
2. Carefully bend each IC lead against the circuit foil pad and solder it.
3. Clean the soldered areas with a small wire-bristle brush. (It is not necessary to reapply acrylic coating to the areas.)

"Small-signal" Discrete Transistor Removal/Replacement

1. Remove the defective transistor by clipping its leads as close as possible to the component body.
2. Bend into a "U" shape the end of each of three leads remaining on the circuit board.
3. Bend into a "U" shape the replacement transistor leads.
4. Connect the replacement transistor leads to the corresponding leads extending from the circuit board and crimp the "U" with long nose pliers to insure metal to metal contact, then solder each connection.

Power Output Transistor Devices Removal/Replacement

1. Heat and remove all solder from around the transistor leads.
2. Remove the heatsink mounting screw (if so equipped).
3. Carefully remove the transistor from the circuit board.
4. Insert new transistor in circuit board.
5. Solder each transistor lead, and clip off excess lead.
6. Replace heatsink.

Diode Removal/Replacement

1. Remove defective diode by clipping its leads as close as possible to diode body.
2. Bend the two remaining leads perpendicularly to the circuit board.
3. Observing diode polarity, wrap each lead out of the new diode around the corresponding lead on the circuit board.
4. Securely crimp each connection and solder it.
5. Inspect (on the circuit board copper side) the solder joints of the two "original" leads. If they are not shiny, reheat them and, if necessary, apply additional solder.

Fuses and Conventional Resistor Removal/Replacement

1. Clip each fuse or resistor lead at top of circuit board hollow stake.
2. Securely crimp leads of replacement component around stake 1/8 inch from top.
3. Solder the connections.
   CAUTION: Maintain original spacing between the replaced component and adjacent components and the circuit board, to prevent excessive component temperatures.

Circuit Board Foil Repair

Excessive heat applied to the copper foil of any printed cir-cuit board will weaken the adhesive that bonds the foil to the circuit board, causing the foil to separate from, or "lift-off," the board. The following guidelines and procedures should be followed whenever this condition is encountered.

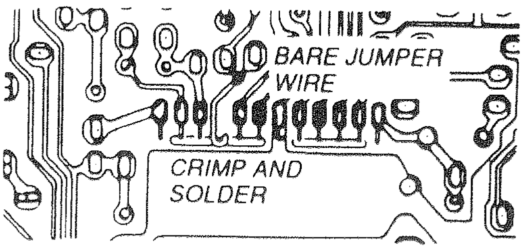
In Critical Copper Pattern Areas

High component/copper pattern density and/or special volt-age/current characteristics make the spacing and integrity of copper pattern in some circuit board areas more critical than in others. The circuit foil in these areas is designated as Critical Copper Pattern and is identified and illustrated in this service data in the section titled Safety Related Copper Pattern (see data in the section titled Safety Related Copper Pattern (see table of contents for page number). Because Critical Copper Pattern requires special soldering techniques to ensure the maintenance of reliability and safety standards, contact your Hitachi personnel.

At IC Connections

To repair defective copper pattern at IC connections, use the following procedure to install a jumper wire on the copper pattern side of the circuit board. (Use this technique only on IC connections.)

1. Carefully remove the damaged copper pattern with a sharp knife. (Remove only as much copper as absolutely necessary.)
2. Carefully scratch away the solder resist and acrylic coating (if used) from the end of the remaining copper pattern.

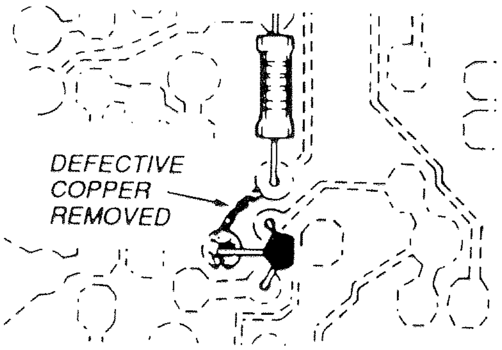


Install Jumper Wire and Solder

3. Bend a small "U" in one end of a small-gauge jumper wire and carefully crimp it around the IC pin. Solder the IC connection.
4. Route the jumper wire along the path of the cut-away copper pattern and let it overlap the previously scraped end of the good copper pattern. Solder the overlapped area, and clip off any excess jumper wire.

At Other connections

Use the following technique to repair defective copper pattern at connections other than IC Pins. This technique involves the installation of a jumper wire on the component side of the circuit board.



Insulated Jumper Wire

1. Remove the defective copper pattern with a sharp knife. Remove at least 1/4 inch of copper, to ensure that a hazardous condition will not exist if the jumper wire opens.
2. Trace along the copper pattern from both sides of the pattern break and locate the nearest component that is directly connected to the affected copper pattern.
3. Connect insulated 20-gauge jumper wire from the lead of the nearest component on one side of the pattern break to the lead of the nearest component on the other side. Carefully crimp and solder the connections.
   CAUTION: Be sure the insulated jumper wire is dressed so that it does not touch components or sharp edges.

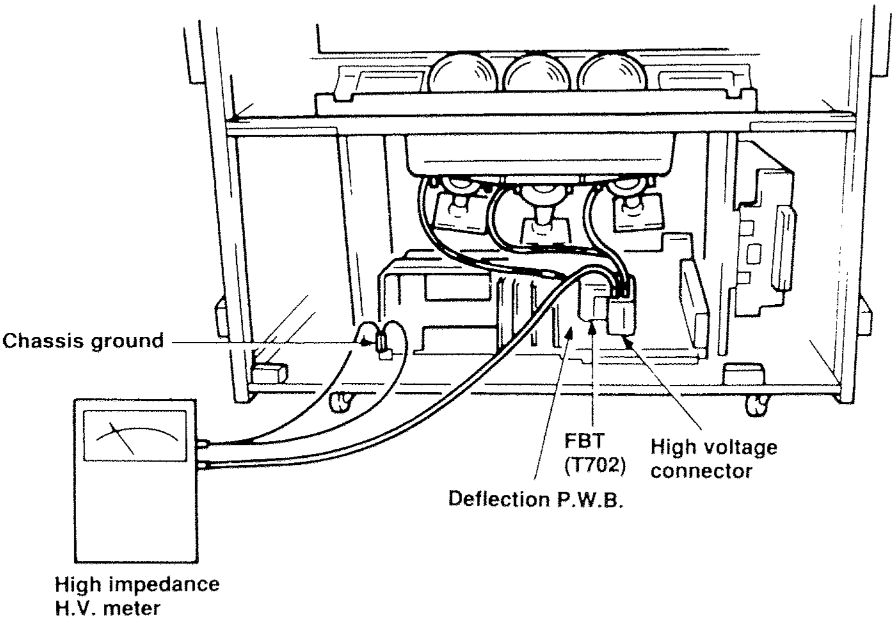
Frequency Synthesis (FS) Tuning Systems

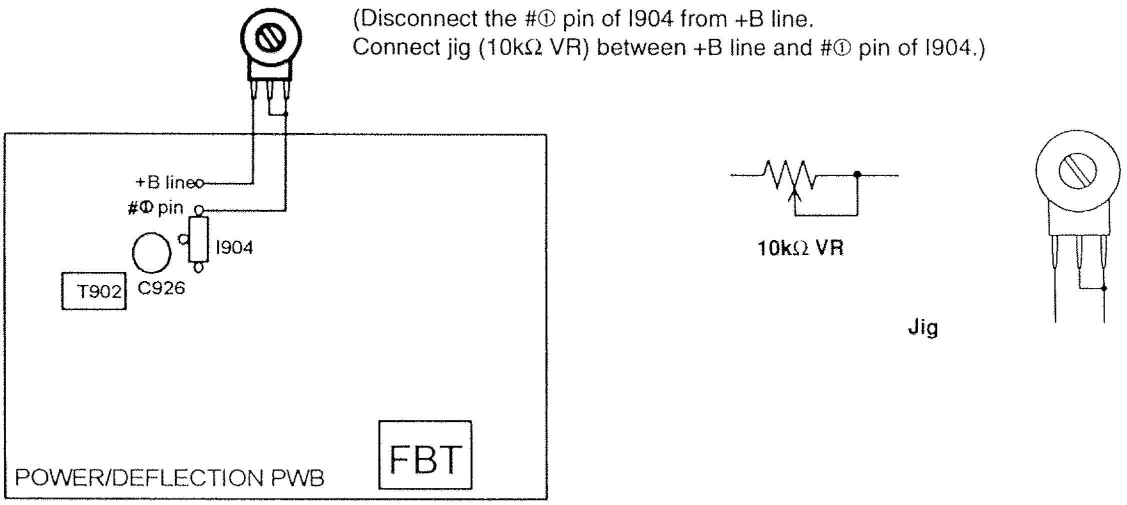
1. Always unplug the instrument AC power cord before disconnecting or reconnecting FS tuning system cables and before removing or inserting FS tuning system modules.
2. The FS tuner must never be disconnected from the FS tuning control module while power is applied to the instrument.
3. When troubleshooting intermittent problems that might be caused by defective cable connection(s) to the FS tuning system, remove the instrument AC power as soon as the defective connector is found and finish confirming the bad connection with a continuity test. This procedure will reduce the probability of electrical overstress of the FS system semi-conductor components.

TECHNICAL CAUTIONS

High Voltage limiter circuit operation check.

1. Turn off TV and connect jig as shown in Figure 2. Adjust jig fully counter-clockwise for minimum resistance.
2. Set the AC input to 120V AC and turn on TV.
3. Confirm test pattern on CRT is a usable picture, then slowly adjust jig until the picture disappears and TV shuts down.
4. When the limiter circuit is operating properly, High Voltage will be less than 37.0kV at 0.6mA when TV shuts down.
5. Turn off set immediately after checking circuit operation.
6. Unplug set for one minute to reset shutdown circuit. Remove jig and voltmeter.


Chassis ground
FBT
(T702)
High voltage
connector
Deflection P.W.B.
High impedance
H.V. meter


(Disconnect the #① pin of I904 from +B line.
Connect jig (10kΩ VR) between +B line and #① pin of I904.)

+B line
#① pin
I904
T902
C926
POWER/DEFLECTION PWB
FBT
10kΩ VR
Jig

Fig. 2 Deflection/Power Supply P.C.B.

SPECIFICATIONS

Model:	50FX18B 50FX19K 55FX20B
Cathode-Ray Tube:	90° deflection 7.0 inch 180DLB22R 180DLB22G 180DLB22B
Power Input:	120 volts AC, 60Hz
Power Consumption:	216 watts - Maximum 163 watts - Operating
Antenna Impedance:	75 ohm Unbalanced VHF/UHF/CATV

Receiving Channel:

	CH
VHF	2-13
EXT. Mid	(A-2)-(A-1),4^{+}
CATV Mid	A-I
CATV Super	J-W
CATV Hyper	(W+29)-(W+53)

Intermediate Frequency:	Picture I-F Carrier 45.75 MHz Sound I-F Carrier 41.25 MHz Color Sub Carrier 42.17 MHz
Video Input:	1 Voltp-p 75 ohm
Video Output:	1 Voltp-p 75 ohm
Audio Input:	0.47 volt rms, 47 k ohm
Stereo Audio Output:	0.47 volt rms, 1 k ohm
Audio Output Power:	Front — 7 watts rms per channel, 8 ohm impedance. Rear — 3 watts per channel, 8 ohm impedance.
Anode Voltage:	30.0 kV (Zero Beam Current)
Brightness:	390 ft-Nominal - (50FX18B/19K) 320 ft-Nominal - (55FX20B) (Peak White)
Speakers:	2 Woofers - 6 inch (16 cm) round

Dimension:	**50FX18B/19K**	**55FX20B**
Height (in.)	51-13/16	54-9/16
Width (in.)	43-3/16	47-1/8
Depth (in.)	23-1/8	26-9/16
Weight (lbs.)	230	267

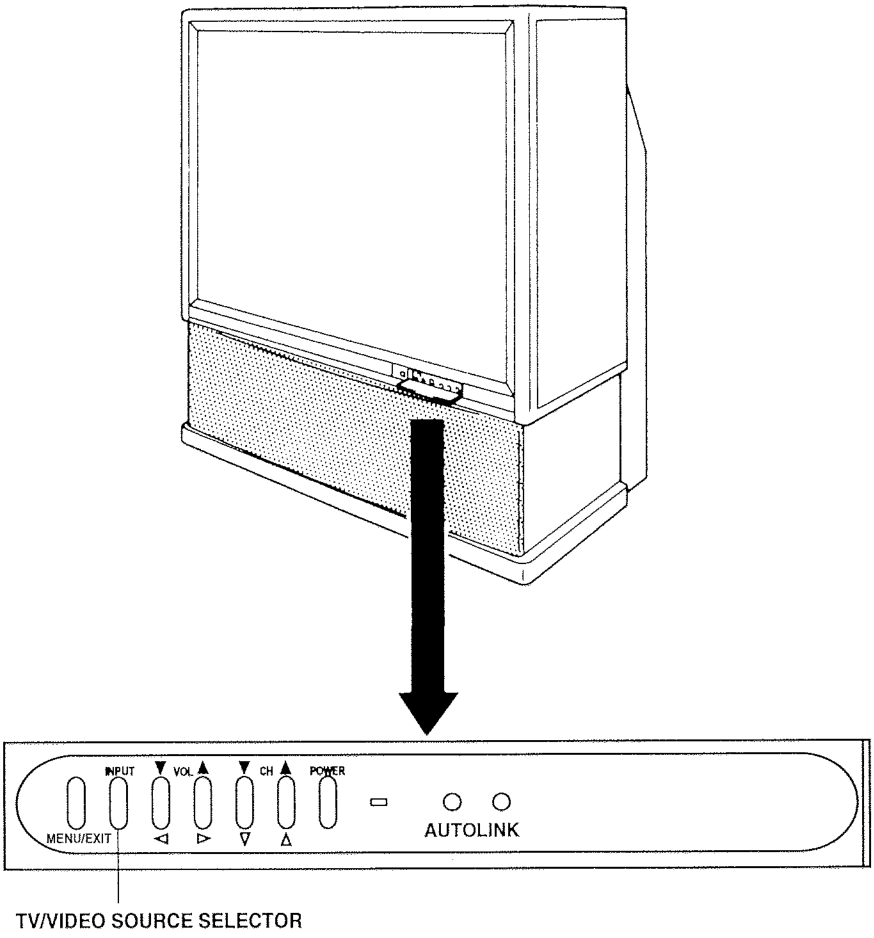
Circuit Board Assemblies:

CPT (B) P.C.B.
CPT (G) P.C.B.
CPT (R) P.C.B.
3 Line Comb. P.C.B.
Signal P.C.B.
Signal Sub P.C.B.
Power/Deflection P.C.B.
Control P.C.B.
Terminal P.C.B.
V.M. P.C.B.
Speaker Terminal P.C.B.

CIRCUIT PROTECTION

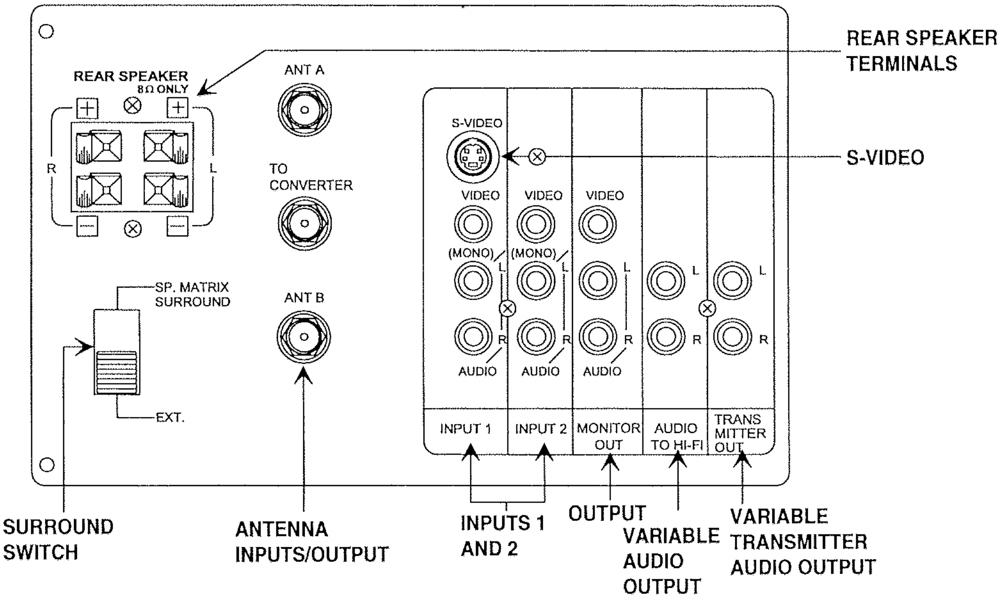
Fuse (or Device)	Circuit Protected	Physical Location
F902 5A/125V AC	Main Fuse	Power/Defl. Circuit Board
F903 5A/125V DC (LITTELFUSE)	Main Fuse	Power/Defl. Circuit Board
F905 4A/125V DC (LITTELFUSE)	26V Supply (Audio)	Power/Defl. Circuit Board
F906 1.6A/125V DC	115V (+B) Supply	Power/Defl. Circuit Board

GENERAL INFORMATION


INPUT
VOL
CH
POWER
MENU/EXIT
AUTOLINK
TV/VIDEO SOURCE SELECTOR

Control Panel
Fig. 3

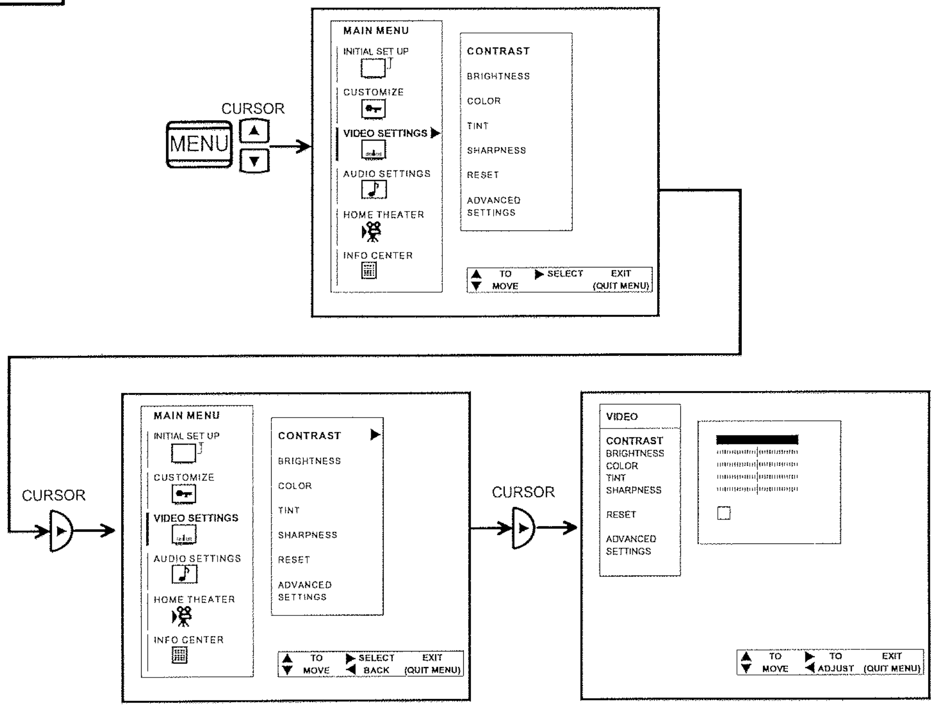
REAR SPEAKER TERMINALS


REAR SPEAKER
8Ω ONLY
R
L
SP. MATRIX
SURROUND
EXT.
ANT A
TO
CONVERTER
ANT B
S-VIDEO
VIDEO
(MONO)
L
R
AUDIO
INPUT 1
INPUT 2
MONITOR OUT
AUDIO TO HI-FI
TRANS MITTER OUT
REAR SPEAKER TERMINALS
S-VIDEO
SURROUND SWITCH
ANTENNA INPUTS/OUTPUT
INPUTS 1 AND 2
OUTPUT
VARIABLE AUDIO OUTPUT
VARIABLE TRANSMITTER AUDIO OUTPUT

Rear Connections Panel
Fig. 4

VIDEO SETTINGS

Select VIDEO SETTINGS to adjust picture settings and improve picture quality.

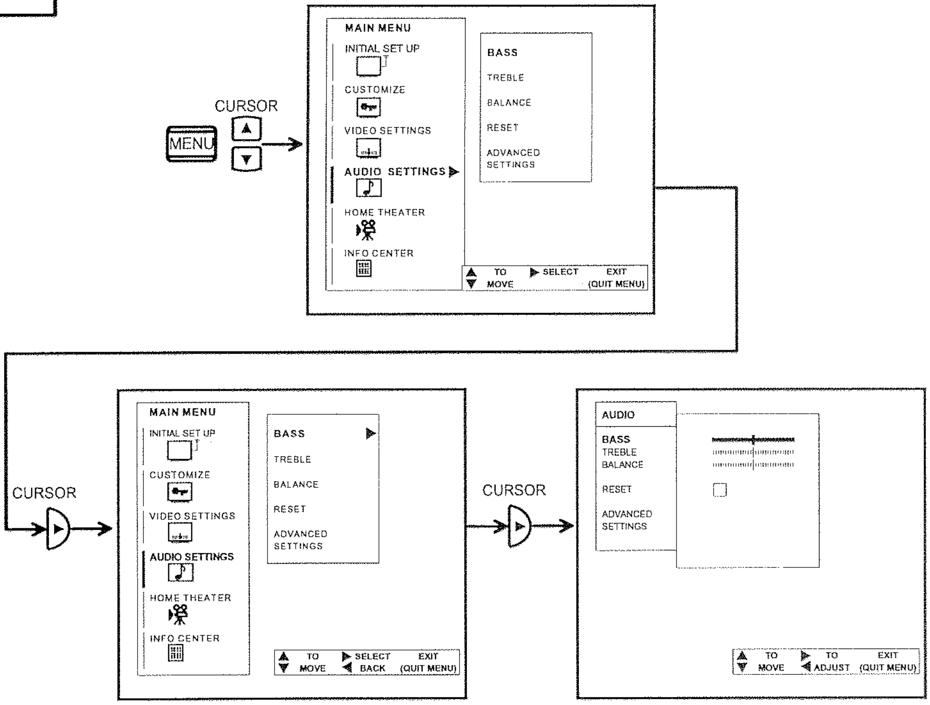

CURSOR
MENU
MAIN MENU
INITIAL SET UP
CUSTOMIZE
VIDEO SETTINGS
AUDIO SETTINGS
HOME THEATER
INFO CENTER
CONTRAST
BRIGHTNESS
COLOR
TINT
SHARPNESS
RESET
ADVANCED SETTINGS
▲▼ TO MOVE
▶ SELECT
◀ BACK
EXIT (QUIT MENU)
VIDEO
▶◀ TO ADJUST

Use the CURSOR ▲ or ▼ to highlight the function to be adjusted.
Press CURSOR ◀ or ▶ to adjust the function.
Use CURSOR ▲ or ▼ to highlight RESET or ADVANCED SETTINGS, then CURSOR ◀ to return to previous menu.
Press EXIT to quit menu.

CONTRAST	Use this function to change the contrast between black and white levels in the picture. This adjustment will only affect the picture when PICTURE SETTINGS AI is OFF.
BRIGHTNESS	Use this function to adjust overall picture brightness.
COLOR	Use this function to adjust the level of color in the picture.
TINT	Use this function to adjust flesh tones so they appear natural.
SHARPNESS	Use this function to adjust the amount of fine detail in the picture.
RESET	When RESET is selected, press CURSOR ▶ to return video adjustments to factory preset conditions.

AUDIO SETTINGS

Select AUDIO SETTINGS to adjust the TV to your preference and to improve the sound quality.


CURSOR
MENU
MAIN MENU
INITIAL SET UP
CUSTOMIZE
VIDEO SETTINGS
AUDIO SETTINGS ▶
HOME THEATER
INFO CENTER
BASS
TREBLE
BALANCE
RESET
ADVANCED SETTINGS
▲▼ TO MOVE
▶ SELECT
EXIT (QUIT MENU)
CURSOR
MAIN MENU
INITIAL SET UP
CUSTOMIZE
VIDEO SETTINGS
AUDIO SETTINGS
HOME THEATER
INFO CENTER
BASS ▶
TREBLE
BALANCE
RESET
ADVANCED SETTINGS
▲▼ TO MOVE
▶ SELECT ◀ BACK
EXIT (QUIT MENU)
CURSOR
AUDIO
BASS
TREBLE
BALANCE
RESET
ADVANCED SETTINGS
▲▼ TO MOVE
▶◀ TO ADJUST
EXIT (QUIT MENU)

Use CURSOR ▲ or ▼ to highlight the function to be adjusted.
Press CURSOR ◀ or ▶ to adjust the function.
Use CURSOR ▲ or ▼ to highlight RESET or ADVANCED SETTINGS, then CURSOR ◀ to return to previous menu.
Press EXIT to quit menu.

BASS

This function controls the low frequency audio to all speakers.

TREBLE

This function controls the high frequency audio to all speakers.

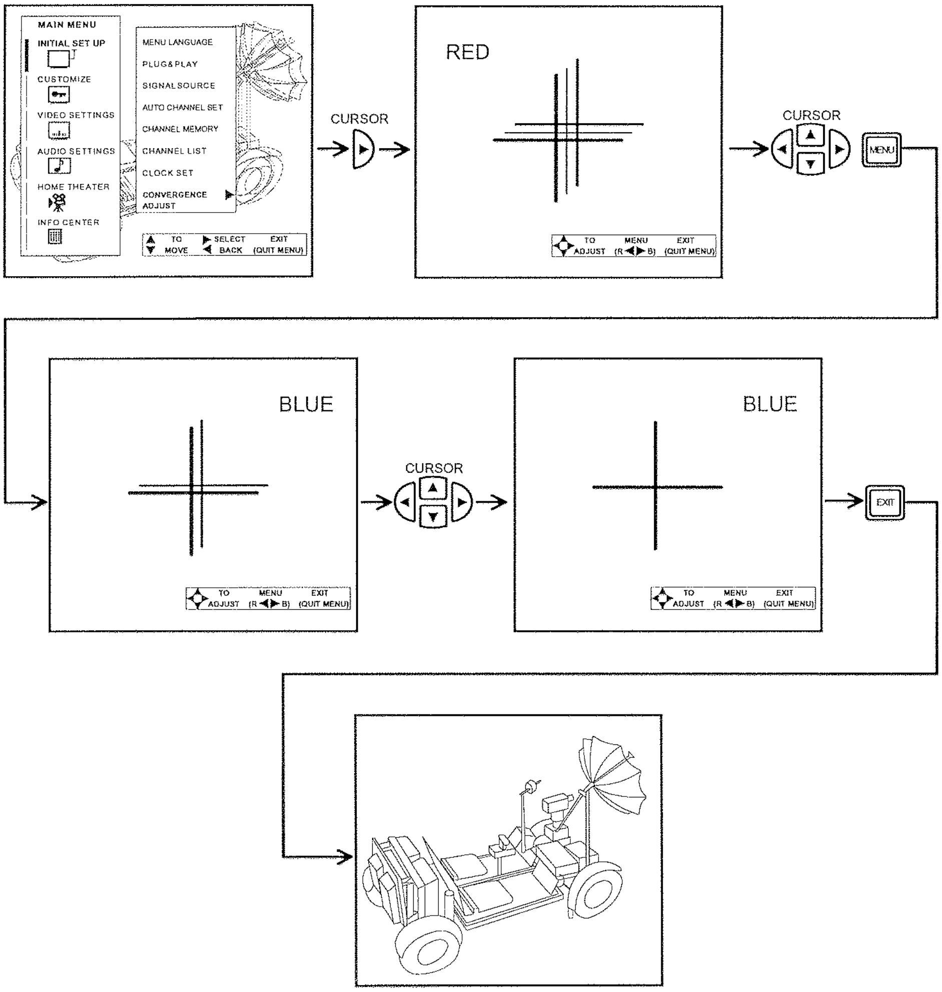
BALANCE

This function will control the left to right balance of the TV internal speakers, the AUDIO TO HI FI output, the TRANSMITTER OUT output, and the Surround Speakers.

RESET

When RESET is selected, press CURSOR ▶ to return audio adjustments to factory preset conditions.

CONVERGENCE ADJUST


MAIN MENU
INITIAL SET UP
CUSTOMIZE
VIDEO SETTINGS
AUDIO SETTINGS
HOME THEATER
INFO CENTER
MENU LANGUAGE
PLUG&PLAY
SIGNAL SOURCE
AUTO CHANNEL SET
CHANNEL MEMORY
CHANNEL LIST
CLOCK SET
CONVERGENCE ADJUST
▲▼ TO MOVE
▶ SELECT ◀ BACK
EXIT (QUIT MENU)
CURSOR
RED
TO ADJUST
MENU (R◀▶B)
EXIT (QUIT MENU)
CURSOR
MENU
BLUE
TO ADJUST
MENU (R◀▶B)
EXIT (QUIT MENU)
CURSOR
BLUE
TO ADJUST
MENU (R◀▶B)
EXIT (QUIT MENU)
EXIT

Press the CURSOR ▲ or ▼ to move the color displayed up or down
Press CURSOR ◀ or ▶ to move the color displayed left or right.
Press MENU to change the color.
Press EXIT to quit menu.

CAUTIONS WHEN CONNECTING/DISCONNECTING THE HV CONNECTOR

Perform the following when the HV connector (anode connector) is removed or inserted for CPT replacement, etc.

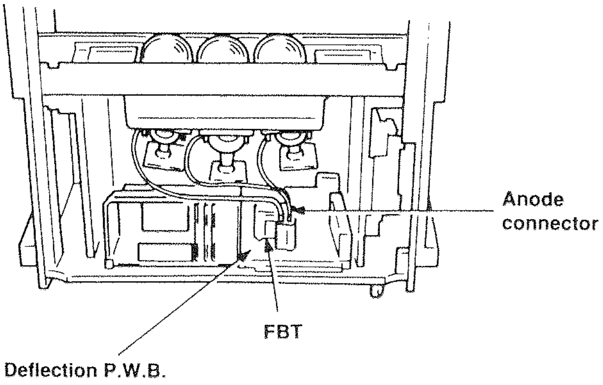

Anode connector
FBT
Deflection P.W.B.

Fig. 5

During Removal

1. Insert a small flat-bladed screwdriver (adjustment screwdriver: 5-7 mm wide and 0.2-0.3 mm thick) into section Ⓐ in Fig. 6 and then push it in the direction of arrow Ⓑ. The lock will release with a click. (The state in Fig. 8 (1) will change to that in Fig. 8 (2).)

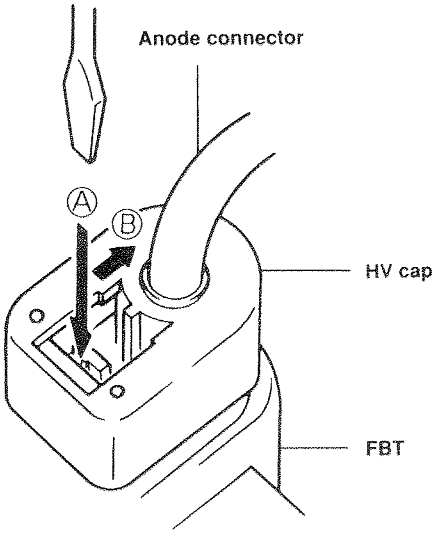

Anode connector
Ⓐ
Ⓑ
HV cap
FBT

Fig. 6

2. Remove the HV cap and remove the anode connector (Fig. 7).

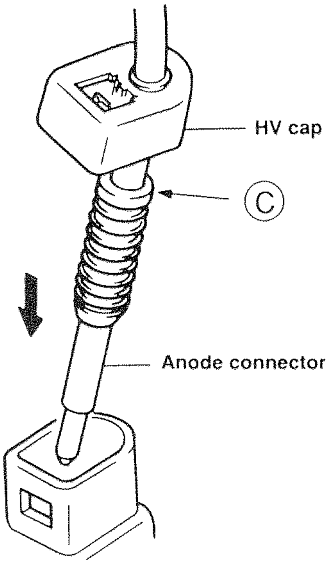
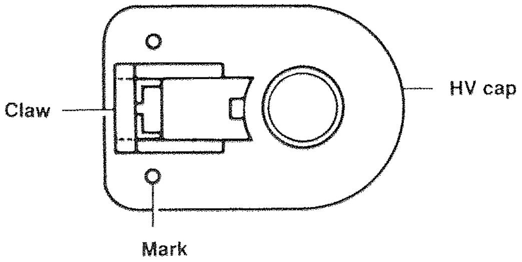

HV cap
Ⓒ
Anode connector

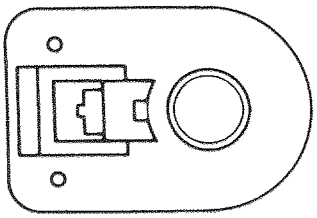
Fig. 7

During Insertion

1. Insert the anode connector deep into the FBT (to section Ⓒ in Fig. 7) and then push the HV cap into the FBT until it clicks.
2. Make sure the connector is securely inserted. (Check that the claw is at the mark on the HV cap shown as in Fig. 8 (1).)


Claw
HV cap
Mark

(1) Lock on
(When connector is inserted)



(2) Release
(When connector is removed)

Fig. 8

ADJUSTMENT INSTRUCTION

1. **ASSEMBLED P.W.B. ADJUSTMENT** 17
    1-1. Memory Initialization 17
    1-2. Comb Filter Operation Check 17
    1-3. Horizontal AFC Coarse Adjustment (R339) 17
    1-4. Sub Picture Position Adjustment 17

2. **FINAL ASSEMBLY ADJUSTMENT** 17
    2-1. Focus Adjustment 17
    2-2. White Balance Adjustment 18
    2-3. Sub Brightness Adjustment 19
    2-4. Sub Picture White Balance Adjustment 19
    2-5. Shoot Balance Adjustment 19
    2-6. Horizontal AFC Adjustment 19
    2-7. Raster Inclination Adjustment (Deflection Yoke) 20
    2-8. Raster Position Adjustment 20
    2-9. Vertical Size Adjustment (R612) 20
    2-10. Horizontal Size Adjustment (R649) 21
    2-11. Beam Alignment 21
    2-12. Beam Shape Adjustment 21
    2-13. Static Focus Adjustment 22
    2-14. Blue Defocus Adjustment 22
    2-15. Static Convergence Adjustment 22
    2-16. Digital Convergence Adjustment 22
        2-16-1. Phase Adjustment (service mode) 23
        2-16-2. Raster Position Adjustment 23
        2-16-3. Convergence Point Adjustment 23
        2-16-4. Digital Convergence Remote Control 24

3. **ADJUSTMENT POINT** 26
    3-1. CRT (R)(G)(B), Cabinet Locations 26
    3-2. Main Chassis (Signal, Power/Deflection P.W.B.) 27
    3-3. CPT (R)(G)(B), Control P.W.B., Focus Pack 28

1. ASSEMBLED PWB ADJUSTMENT

1.1 Memory initialization

Adjustment procedure

(1) Press memory initialize key using the R/C.
If you do not have this key, short the pins of the 2 pin connector PI1 for one second, then remove.
A beep will be heard.

(2) Check the OSD according to the chassis type.

Initialize OSD (Memory Switches)

MEMORY SWITCH		
PIP 1	0	$\boxed{1}$
PIP 2	0	$\boxed{1}$
POWER ON1	0	$\boxed{1}$
POWER ON2	$\boxed{0}$	1
AUX 3	$\boxed{0}$	1
SUR 1	$\boxed{0}$	1
SUR 2	$\boxed{0}$	1
MAGIC F.	$\boxed{0}$	1
W. CONT	0	$\boxed{1}$
S. CONT	$\boxed{0}$	1
ANT	0	$\boxed{1}$
CTV/PTV	0	$\boxed{1}$
D. BASS	0	$\boxed{1}$
3D Y/C	$\boxed{0}$	1
NOTCH	$\boxed{0}$	1
PIP POSITION HP	0111	(0000-1111)
VP	0111	(0000-1111)
SHOOT BAL. ADJ	37	(0-63)
SUB BRIGHT ADJ	127	(63-191)

Note: The above table explains the AP62 chassis specification for the memory switch arrangement.

(3) Press Memory Initialize key of the R/C one more time and check that the set is returned to factory shipping conditions.
If you do not have this key, short the pins of the 2 pin connector PI1 for one second, then remove.

Note: The TV will be set to factory shipping conditions. Do not unplug set or press any buttons during this operation.

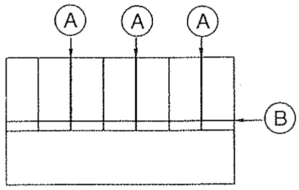
1.2 Comb filter operation check

Adjustment preparation

(1) Receive the color bar signal at the regular tuning point.
(2) Set the contrast control to MAX and the other controls to center.
(3) Set the AI to OFF.

Adjustment procedure

(1) Check that between the color bars there are line dots every second color bar as shown in the drawing.



Check Ⓐ and Ⓑ line dots.

	AP62
	Dots
Ⓐ	X
Ⓑ	None

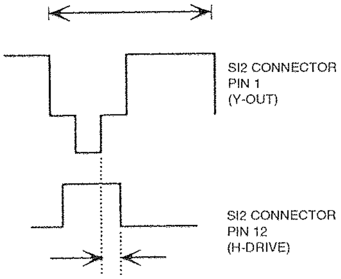
1.3 Horizontal coarse AFC adjustment (R339)

Adjustment preparation

(1) Receive the reverse cross-hatch pattern signal. (Cross-hatch lines are black.)
(2) Connect the oscilloscope to SI2 connector pin ① (Y-out) and pin ⑫ (H-Drive).

Adjustment procedure

(1) Adjust R339 (AFC) for 13µs delay between pin① and ⑫.



13µs +/- 0.5µs

1.4 Sub-picture position adjustment

Adjustment preparation

(1) Select signal on main picture.
(2) Video settings have to be at normal condition.
(3) Select the single PIP mode.

Adjustment procedure

(1) Press the Memory Initialize key on the R/C. If you do not have this key, short the pins of the 2 pin connector PI1 for one second, then remove. A beep will be heard.
(2) Press the ▼▲ buttons to select the PIP position mode.
(3) Adjust the VP (vertical) and HP (horizontal) position using the◀▶ buttons.
(4) Press the Memory Initialize key of the R/C to store the value in memory. If you do not have this key, short the pins of the 2 pin connector PI1 for one second, then remove.
(5) Select single PIP mode and shift the sub-picture using the 'shift' button. Distance between PIP and edge of screen should be equal when shifted. If it is not, repeat (1) ~ (5).

Note: Check the position of Multi PIP mode. Check the right edge of the sub-pictures for MV-4 to make sure there is no separation between the Multi PIP and the edge of the screen.

2. FINAL ASSEMBLY ADJUSTMENT

2.1 Focus adjustment

Adjustment preparation

(1) The set can face in any direction, west, east, north or south.
(2) Receive the cross-hatch pattern signal.
CONTRAST: CENTER
BRIGHTNESS: -16 (-8 position shown on display)
(3) The electrical focus adjustment should have been completed.
(4) The centering DY inclination should have been adjusted.

Adjustment procedure

(1) Loosen the fixing screw on the lens cylinder so that the lens cylinder can be turned. (Be careful not to loosen too much. If it is loosened too much, rattling when tightening becomes greater and the focus may drift.) After completing steps (5), (6) and (7) below, tighten the fixing screws for each lens with a torque of 7-12kg/cm.

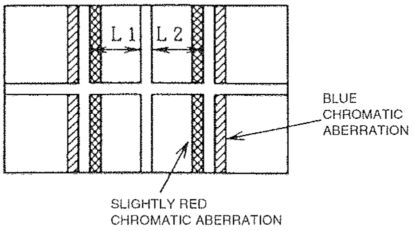
(2) Apply covers to 2 of R, G and B lenses, and project a single color on the screen and adjust in sequence.
(The adjustment order of R, G and B is only an example.)

(3) For each of the R, G and B lenses, observe the color aberration generated on the outer circumference of the cross-hatch bright line at the center section ± 3 pitches vertically and horizontally from the center.

(4) If the lens adjustment knob is turned clockwise, viewed from the front, the color aberration changes as follows.

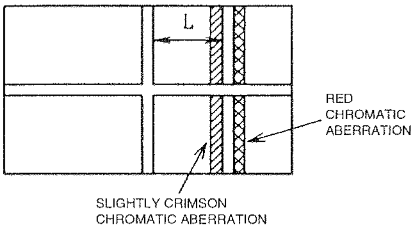
Lens	Change of color aberration
R lens	Red ⟶ Crimson
G lens	Blue ⟶ Red
B lens	Purple ⟶ Green

(5) In case of G lens, set to the point where the chromatic aberration switches from blue to red. If the chromatic aberration appearing all over the screen is not the same, observe the horizontal bright line at the center of the screen and set to the position where red chromatic aberration slightly appears inside and blue outside (reference value: 1-3mm) within the cross-hatch pitches specified in Table below. When the red chromatic aberration appearing at both sides of the bright line is not equal, observe the side with larger chromatic aberration when adjusting.



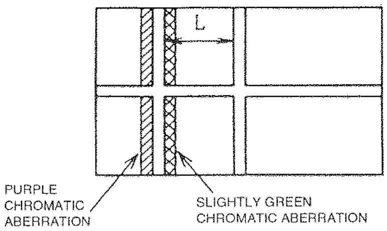
Set Size	Pitch between L1 & L2
50"	3.0 cross-hatch pitches
55"	3.0 cross-hatch pitches

(6) In case of R lens, set to the position where the chromatic aberration changes from red to crimson.
As shown below, observe the horizontal bright line at the center and set to the position where the crimson chromatic aberration slightly appears inside and red outside (reference value: 1-3mm) within the cross-hatch pitches specified in Table.



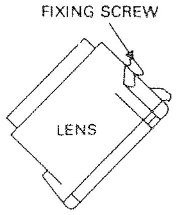
Set Size	Pitch between L
50"	3.0 cross-hatch pitches
55"	3.0 cross-hatch pitches

(7) In case of B lens, set to the position where the chromatic aberration changes from purple to green. As shown below, observe the horizontal bright line at the center and set to the position where green chromatic aberration slightly appears inside and purple outside (reference value: 1-3mm) within the cross-hatch pitches specified in table below.

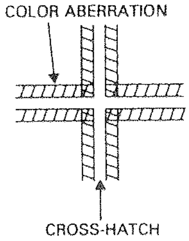

L
PURPLE CHROMATIC ABERRATION
SLIGHTLY GREEN CHROMATIC ABERRATION

Set Size	Pitch between L
50"	3.0 cross-hatch pitches
55"	3.0 cross-hatch pitches

Notes: (1) Fixing screw



(2) Color aberration



(3) Since the G light is very important for picture quality and performance, pay special attention in its adjustment.

Note: Be careful not to touch the lens with your fingers when adjusting.

(4) For red, setting to the center between red and crimson is optimum.

(5) For blue, setting to the center between purple and green is optimum.

2.2 White balance adjustment

(1) Screen adjustment
(2) High brightness white balance
(3) Low brightness white balance

Screen adjustment VRs	Drive adjustment VRs
Red: Focus Pack	Red: R873
Green: Focus Pack	Green: R843
Blue: Focus Pack	

Adjustment preparation

(1) Start adjustment 20 minutes or more after the power is turned on.

(2) The vertical incident illumination on the screen should be 20 lux or less.

(3) Set the video settings (contrast: max, others: center) to standard condition.

(4) For low brightness white balance adjustment, input a white raster signal level of 0.300Vp-p (Video input level).

(5) For high brightness white balance adjustment, input a white raster signal level of 0.715Vp-p (Video input level).

(6) Set the drive adjustment VRs (red and green) to 12 ~ 2 o'clock position.

(7) Turn the screen adjustment VRs (red, green, blue) fully counterclockwise.
(8) Set video advanced setting white control to warm position.
(9) Set the S301 switch to the front as viewed from the front of the signal sub P.W.B. (Set to SERVICE side.)

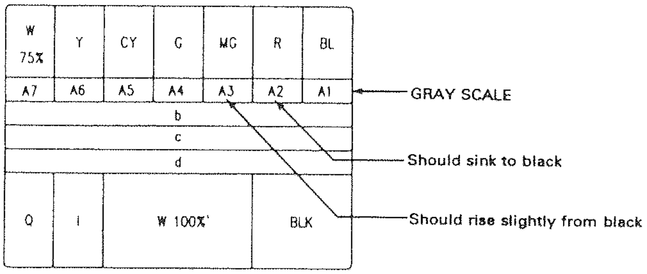
Adjustment procedure
(1) Gradually turn the screen adjustment VRs (red, green, blue) clockwise and set them where the red, green and blue slightly bright lines just appear evenly on the screen.
(2) Return S301 to the NORMAL side.
(3) Select the input signal for high brightness. (video level = 0.715Vp-p ± 0.015).
(4) Adjust the high brightness white balance using the drive adjustment VRs (red, green).
(5) Select the input signal for low brightness (video level = 0.300Vp-p ± 0. 015).
(6) Adjust the low brightness white balance using the screen adjustment VRs (red, green, blue). (Visually adjust.)
(7) Check that high brightness white balance is obtained. If it does not, return to step (5).

Note: When adjusting the white balance, if the horizontal single raster is to be obtained using S301, check that the screen adjustment VRs are turned fully counterclockwise. Since the phosphorescent surface of the CRT is likely to be burnt, be careful.

White balance: 7500ºK+0MPCD
Color coordinate: X.....0.301
Y.....0.310

2.3 Sub brightness adjustment

Adjustment preparation
(1) Start adjustment 20 minutes or more after the power is turned on. Receive the color bar signal.
(2) Set the contrast and color controls to minimum.
(3) The vertical incident illumination on the screen should be 20 lux or less.



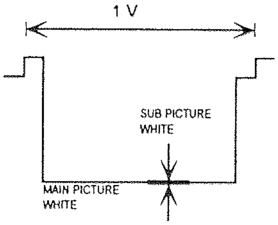
Adjustment procedure
(1) Press the memory initialize key on the R/C. If you do not have this key, short the pins of the 2 pin connector PI1 for one second, then remove. A beep will be heard.
(2) Press the ▲ button to select SUB-BRIGHTNESS mode.
(3) Use the ◀▶ buttons to increase or decrease so that points A1 and A2 sink to black and A3 rises slightly above it. (Visually adjust)
(4) After above adjustment, SUB-BRIGHTNESS will have value between 63 and 191. Adjustment is now complete.
(5) After adjustment is done, press the memory initialize key on the R/C one more time and the data is stored in memory. If you do not have this key, short the pins of the 2 pin connector PI1 for one second, then remove.

Note: When selecting SUB-BRIGHTNESS mode the μcon sets the CONTRAST and COLOR to min. automatically but make sure that the other conditions are center. Directly observe the screen by eye without using a mirror.

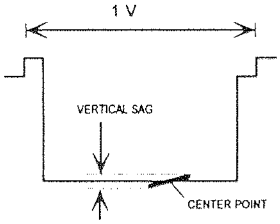
2.4 Sub picture white balance adjustment (R029, R026, R024)

Adjustment preparation
(1) Start adjustment after power is on for 20 minutes.
(2) Use a white raster signal for adjustment.
(3) Press "FREEZE" on the remote control and select 'single' freeze mode to display the sub picture.
(4) Set contrast to center, brightness minimum, AI off.

Adjustment procedure
(1) Connect oscilloscope to P802 and adjust R029 to match blue level of main and sub pictures.
(2) Repeat for P832 and R026 green, P862 and R024 for red.



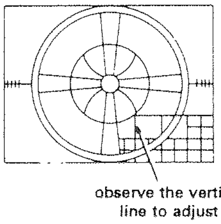
Note: If the sub picture has a signal sag, adjust level at center point.



2.5. Shoot balance adjustment (R333)

Adjustment preparation
(1) Receive the reverse cross-hatch pattern signal. (Cross-hatch lines are black.)
(2) Set the video condition to factory reset.

Adjustment procedure
(1) Press the memory initialize key of the R/C. If you do not have this key, short the pins of the 2 pin connector PI1 for one second, then remove. A beep will be heard.
(2) Press the ▲ button and select SHOOT BALANCE mode.
(3) Using the ◀▶ buttons, gradually adjust so the widths of pre-shoot and over-shoot of the vertical line (black) shown in the circle pattern are balanced. (Visually adjust)
(4) After adjustment is done, press the memory initialize key on the R/C one more time and the data is stored in memory. If you do not have this key, short the pins of the 2 pin connector PI1 for one second, then remove.

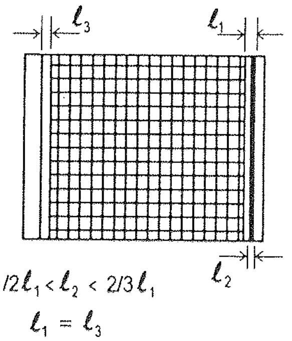


Note: Directly observe the screen by eye without using a mirror.

2.6 Horizontal AFC adjustment (R339)

Adjustment preparation
(1) Receive the reverse cross-hatch pattern signal. (Cross-hatch lines are black.)
(2) Set video conditions to factory reset.
(3) Lens focus should be completed.
(4) Electrical focus should be coarse adjusted.
(5) The digital convergence RAM should be cleared (uncorrected state). With the TV set off, press and hold the service switch located on the power/defl. P.C.B. (see page 27), and then press the power button.
(6) Raster inclination should be completed.

Adjustment procedure
(1) Project only green color. Cover R & B lenses or short 2P mini connectors on CPT P.W.B.'s.
(2) Adjust H-size to minimum. R649 fully counterclockwise.
(3) Adjust green centering magnet (located on DY) to shift picture left to display edge of raster.
(4) Adjust AFC (R339) so foldover of front porch occurs. Amount of foldover is 1/2 to 2/3 of front porch (ℓ_1).

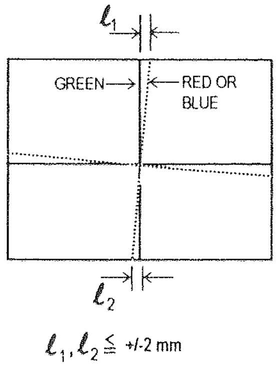


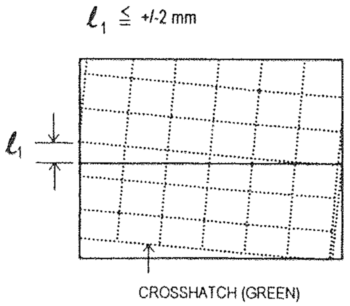
Note: (1) Front and back porch of video should be equal.
(2) If adjustment is difficult with test pattern, follow adjustment 1.3.

2.7 Raster inclination adjustment (Deflection yoke)

Adjustment preparation
(1) The set can face east or west.
(2) Input the single cross test signal.
(3) Set video conditions to factory reset.
(4) The lens focus adjustment should have been completed.
(5) The electric focus should have been coarse adjusted.
(6) The digital convergence RAM should be cleared (uncorrected state). With the TV set off, press and hold the service switch located on the power/defl. P.C.B. (see page 27), and then press the power button.
(7) Start adjustment 20 minutes or more after TV is turned on.

Adjustment procedure
(1) Apply covers to the R and B lenses and project only green light.
(2) Turn the G deflection yoke and adjust the vertical raster inclination.
(3) Then, remove the cover of R or B lens and project red or blue light and green light together on the screen.
(4) Turn the deflection yoke of R or B and set so that the inclination of R or B with respect to the green light is as shown below on the top and bottom sides.
(5) After raster inclination adjustment, fixing screw of DY should be screwed with 12±2 kg•cm torque.





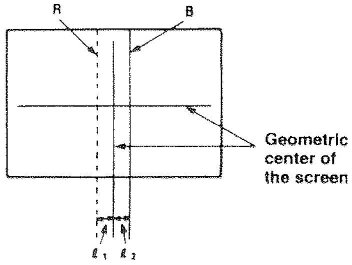
Notes: (1) If internal cross-hatch does not appear after clearing RAM data, press the service switch (see page 27) again.
(2) To restore old RAM data, turn TV off and on.

2.8 Raster position adjustment

Adjustment preparation
(1) The set can face east or west.
(2) Input the single cross test signal.
(3) Set video conditions to factory reset.
(4) The lens focus adjustment should have been completed.
(5) The electric focus should have been coarse adjusted.
(6) The digital convergence RAM should be cleared (uncorrected state). With the TV set off, press and hold the service switch located on the power/defl. P.C.B. (see page 27), and then press the power button. Use a small insulated tool to reach inside the control panel to press the switch.
(7) Start adjustment 20 minutes or more after TV is turned on.

Adjustment procedure
(1) Turn the centering magnets for red, green, and blue to satisfy the condition below. The red and blue horizontal lines should match with green.

Size	Vert. Line	Side of Green
50"	Red l_1	7mm left
50"	Blue l_2	42mm right
55"	Red l_1	7mm left
55"	Blue l_2	42mm right



Notes: (1) If internal cross-hatch does not appear after clearing RAM data, press the service switch (see page 27) again.
(2) To restore old RAM data, turn TV off and on.

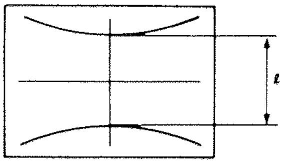
2.9 Vertical size adjustment (R612)

Adjustment preparation
(1) The set can face east or west.
(2) Input the single cross test signal.
(3) Set video conditions to factory reset.
(4) The lens focus adjustment should have been completed.
(5) The electric focus should have been coarse adjusted.
(6) The digital convergence RAM should be cleared (uncorrected state). With the TV set off, press and hold the service switch located on the power/defl. P.C.B. (see page 27), and then press the power button.
(7) Start adjustment 20 minutes or more after TV is turned on.

Adjustment procedure
(1) Turn only the green by applying covers to the red and blue lens or shorting the 2 pin TS connectors on the red and blue CPT P.W.B.
(2) Count the vertical lines of the DCU cross hatch. If the number of vertical lines is 9, go to step (3). If the number of vertical lines is 8, push "SRD" key and then push "5" key on the R/C so the number of vertical lines becomes "9".
(3) Turn vertical amplitude adjustment VR (R612) so that the distance between the top and bottom horizontal lines is equal to the size shown in the table.

Size	l
50"	650 ± 5mm
55"	715 ± 5mm

Note: (1) If internal cross-hatch does not appear after clearing RAM data, press the service switch (see page 27) again.
(2) To restore old RAM data, turn TV off and on.
(3) 'SRD' key is not on R/C CLU-417UI. If 'SRD' is needed, please use R/C CLU-951MP.

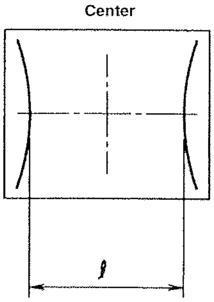


2.10 Horizontal size adjustment (R649)

Adjustment preparation
(1) The set can face east or west.
(2) Input the single cross test signal.
(3) Set video conditions to factory reset.
(4) The lens focus adjustment should have been completed.
(5) The electric focus should have been coarse adjusted.
(6) The digital convergence RAM should be cleared (uncorrected state). With the TV set off, press and hold the service switch located on the power/defl. P.C.B. (see page 27), and then press the power button.
(7) Start adjustment 20 minutes or more after TV is turned on.

Adjustment procedure
(1) Project only green, the same as 2.9.
(2) Turn horizontal amplitude adjustment VR (R649) so distance between the left and right vertical lines is equal to the size shown in the table.

Size	l
50"	950 ± 5mm
55"	1045 ± 5mm

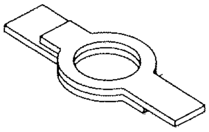


Note: (1) If internal cross-hatch does not appear after clearing RAM data, press the service switch (see page 27) again.
(2) To restore old RAM data, turn TV off and on.

2.11 Beam alignment

Adjustment preparation
(1) Adjust at least 30 minutes after turning on power switch.
(2) The static convergence data should be cleared (see section 1.1 Memory initialization).
(3) Raster inclination, centering, horizontal and vertical amplitudes and optical focus adjustment should be completed.
(4) Set video conditions to factory reset.
(5) Receive cross-hatch signals. (Use of internal cross-hatch signals allowed.)
(6) Short-circuit all metal parts (metal fittings, centering magnet) installed on the projection tubes to GNDs of the projection tubes.
Since metal parts are charged with electricity, shocks may be caused if they are not short-circuited.

Adjustment procedure
(1) Green (G) tube beam alignment adjustment. Short-circuit 2P subminiature connector plug pins of Red (R) and Blue (B) on the CPT boards and project only Green (G) tube.
(2) Put Green (G) tube beam alignment magnet to the cancel state as shown below.

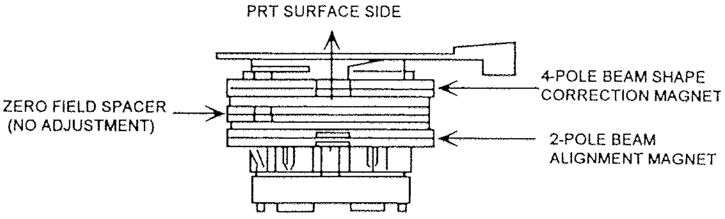


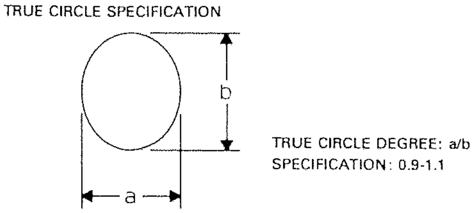
(3) Turn the Green (G) static focus (Focus Pack) counterclockwise all the way and make sure of position of cross-hatch center on screen. (Halo state.)
(4) Turn Green (G) static focus (Focus Pack) clockwise all the way. (Blooming state.)
(5) Turn two magnets forming alignment magnet in any desired direction and move cross-hatch center to position found in (3).
(6) If image position does not shift when Green (G) static focus (Focus Pack) is turned, Green (G) beam alignment has been completed.
(7) If image position shifts when Green (G) statis focus (Focus Pack) is turned, repeat (2)-(6).
(8) Conduct beam alignment for Red (R) focus: Focus Pack EFPK Blue (B) focus: Focus Pack EFPK
(9) Upon completion of adjustment, fix beam alignment magnets with white paint.

2.12 Beam shape adjustment

Adjustment preparation
(1) The beam alignment should have been completed.
(2) The raster inclination, centering, horizontal/vertical amplitude and optical focus adjustments should have been completed.
(3) Set video conditions to factory reset.
(4) Input the dot signal.

Adjustment procedure
(1) Green PRT beam shape adjustment. Short-circuit 2P submini connectors on Red and Blue CPT P.W.B.s to project only the Green beam.
(2) Turn the green static focus fully clockwise. (Blooming.)
(3) Make the dot at the screen center a true circle using the 4-pole magnet as shown below.
(4) Also adjust the Red and Blue PRT beam shapes according to the steps (1) to (3).
(5) After the adjustment is completed, return R, G and B static VRs to the Just focus point.


PRT SURFACE SIDE
4-POLE BEAM SHAPE CORRECTION MAGNET
ZERO FIELD SPACER (NO ADJUSTMENT)
2-POLE BEAM ALIGNMENT MAGNET



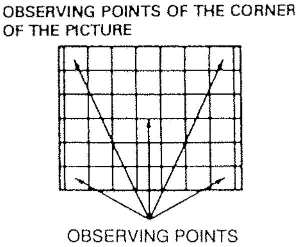
2.13 Static focus adjustment

Adjustment preparation

1. (1) The raster inclination, centering, horizontal/vertical amplitude and optical/electrical focus beam alignment should have been adjusted.
2. (2) The static convergence data should be cleared.
3. (3) Set video conditions to factory reset.
4. (4) Receive the cross-hatch pattern signal.
5. (5) Apply covers to the lenses of colors other than the color to be adjusted and project a single color.

Adjustment procedure

1. (1) Red (R), Green (G) and Blue (B) static focus adjustment. Vary the static focus VR (focus pack EFPK) and make the center of the cross-hatch pattern clearest.
2. (2) Observe the corners of the picture and check that the focus does not get conspicuously worse.



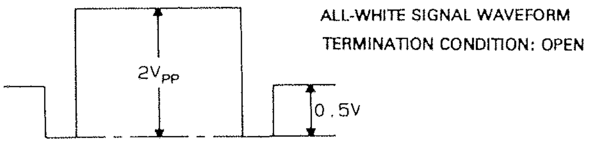
2.14 Blue defocus adjustment

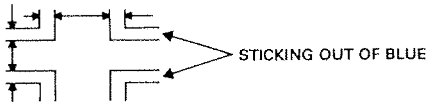
Adjustment preparation

1. (1) Optical and electrical focus adjustment should have been completed.
2. (2) The convergence adjustment should have been completed.
3. (3) Set video conditions to factory reset.

Adjustment procedure

1. (1) Input an all-white signal shown below to VIDEO input.
2. (2) Short-circuit 2P sub-mini connectors on the red and green CPT P.W.B.s to display only the blue beam.
3. (3) Turn the B Focus VR (Focus Pack) fully clockwise.
4. (4) Measure the brightness at the center of the screen and turn the B Focus VR (Focus Pack) counterclockwise to adjust the brightness of blue as shown in Table below.
5. (5) After the adjustment is completed, if blue exceeds the specification, turn and adjust focus so that the sticking out part of blue satisfies the specification.





UNEVENNESS SPECIFICATION: ±1cd/m²

Defocus brightness specification

Screen Size	Brightness of Blue
50"	37 cd/m²
55"	30 cd/m²

Defocus sticking out specification

Screen Size	Blue sticking out
50"	1.0 mm
55"	1.0 mm

Condition: User controls are set to the initial set positions (for shipment) Measuring point Screen center.

Cautions: Correct the brightness gauge and amplitude of the all-white signal periodically. The aperture angle of the brightness gauge is 1°.
Use a cross-hatch pattern to check.

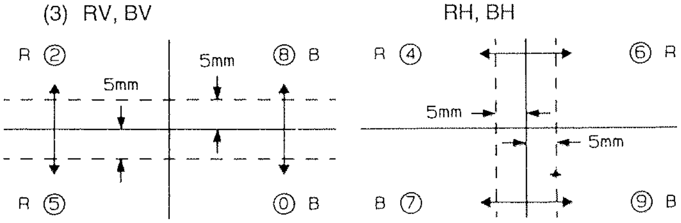
2.15 Static convergence adjustment

Adjustment preparation

1. (1) The screen can face east or west.
2. (2) Display the cross pattern signal or the cross-hatch pattern signal.
3. (3) R, G and B lens focus adjustment and R, G and B raster inclination adjustment should have been completed.
4. (4) R, G, and B raster position (centering magnet) adjustment should have been completed.
5. (5) Vertical and horizontal size adjustments should have been completed.

Adjustment procedure

1. (1) Set to convergence adjust mode using the MENU and CURSOR buttons of the remote control.
2. (2) Check that the variable range of the static convergence adjustment is obtained as shown below using the cursor buttons of the remote control transmitter.
3. (3) RV, BV



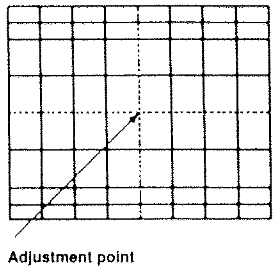
If the adjustment cannot be done, turn the centering magnets for R and B and re-adjust the R and B raster position.

Note: (1) Static convergence is set to standard mode during memory initialization.
(2) Refer to page 14 for static convergence adjustment.

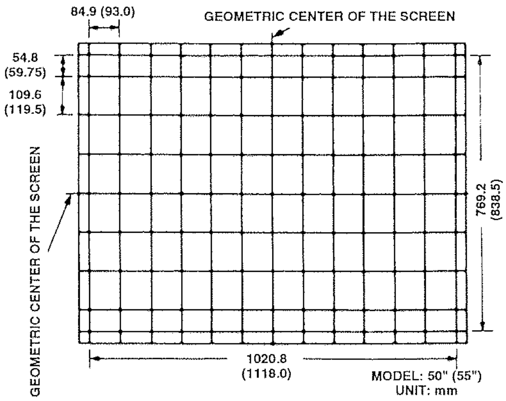
2.16 Digital convergence adjustment

Adjustment preparation

1. (1) Receive an RF or video signal.
2. (2) Set controls to factory preset.
3. (3) Install jig screen on the set.
4. (4) Note the center of the video pattern displayed. This is necessary to match dotted lines (adjustment point viewed) and actual point that is adjusted and displayed by the video signal.
5. (5) Press the service only switch. (See page 27). The pattern displayed is now the digital convergence mode.
6. (6) When performing a complete digital convergence adjustment CLEAR DATA in RAM. See 2.7. (1)-(7).



JIG SCREEN SPECIFICATION



Notes: (1) Jig screen part number:
50" - H310354
55" - H310356

(2) If only minor adjustments to convergence are needed, the jig screen is not necessary. Use digital data stored in memory and one color as a reference (red, green, or blue). DO NOT CLEAR DATA and WRITE to ROM memory.

2.16.1. Phase adjustment (service mode)

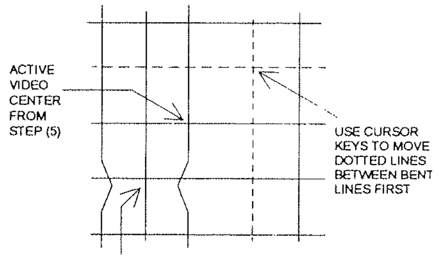
Adjustment preparation

(1) PHASE adjustment — This is to match the digital convergence cursor position to the video image displayed, and to match the digital convergence cursor position (dotted lines) to digital convergence data position (bent lines).

Adjustment procedure

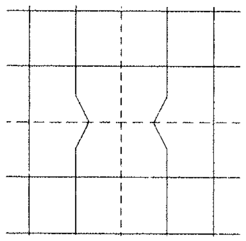
(1) Press the SRD button on the remote to select phase adjustment. (Only Green displayed)
(2) Identify the bent lines and use the cursor buttons to move the dotted lines in between as shown.
(3) Press SRD to exit PHASE mode.
(4) Press ENTER 5 times to display external signal.
(5) Identify center of active video, then press ENTER 5 times to return to internal cross-hatch.
(6) Press SRD (phase adj.), and use 2, 4, 5 and 6 to position internal cross-hatch center on active video center identified in step (5).
(7) Press SRD to exit PHASE mode.

BEFORE



THEN USE NUMBER KEYS TO MATCH INTERNAL CROSSHATCH CENTER TO ACTIVE VIDEO CENTER

AFTER



2.16.2. Raster position adjustment

Adjustment preparation

(1) Position adjustment — This will move an entire color. Use this adjustment to match colors at the center of the screen. (Active video center from external signal and physical screen center should now match from phase adj. 2.16.1.).
(2) Use the buttons below to switch color to adjust.
"RECALL" - Green
"O" - Red
"AVX" - Blue

Adjustment procedure

(1) Press the FREEZE button. Extra horizontal lines appear to confirm raster position mode.
(2) Use the cursor buttons to adjust position.
(3) Press FREEZE again to exit raster position mode.

Notes: (1) Other functions cannot be accessed when in raster position adjustment mode. Press FREEZE and confirm extra horizontal lines disappear to exit raster position mode.
(2) Press MENU to switch between all colors displayed or adjustment color and Green only.

2.16.3. Convergence point adjustment

Adjustment preparation

(1) Select color to adjust.
"RECALL" - Green
"O" - Red
"AVX" - Blue
(2) Use 4, 6, 2, and 5 to move the cursor position (dotted lines).
(3) Use cursor buttons to move the convergence point.
(4) Three adjustment modes are available:
1. (3x3) Press "RECALL" 5 times
2. (7x5) Press "O" 5 times
3. (13x9) Press "AVX" 5 times

For touch-up, only the (13x9) mode is necessary. This will adjust every cross-hatch intersection point on the screen.
For complete adjustment, start with (3x3) mode. This will adjust center point and eight edge points only, but will greatly reduce adjustment time. Then use (7x5) mode, and finally (13x9) mode to finish convergence.
If "S" distortion appears between cross-hatch lines repeat (7x5) mode to change calculation process while adjusting to remove distortion, then return to (13x9) mode to finish touch-up convergence.

Adjustment procedure

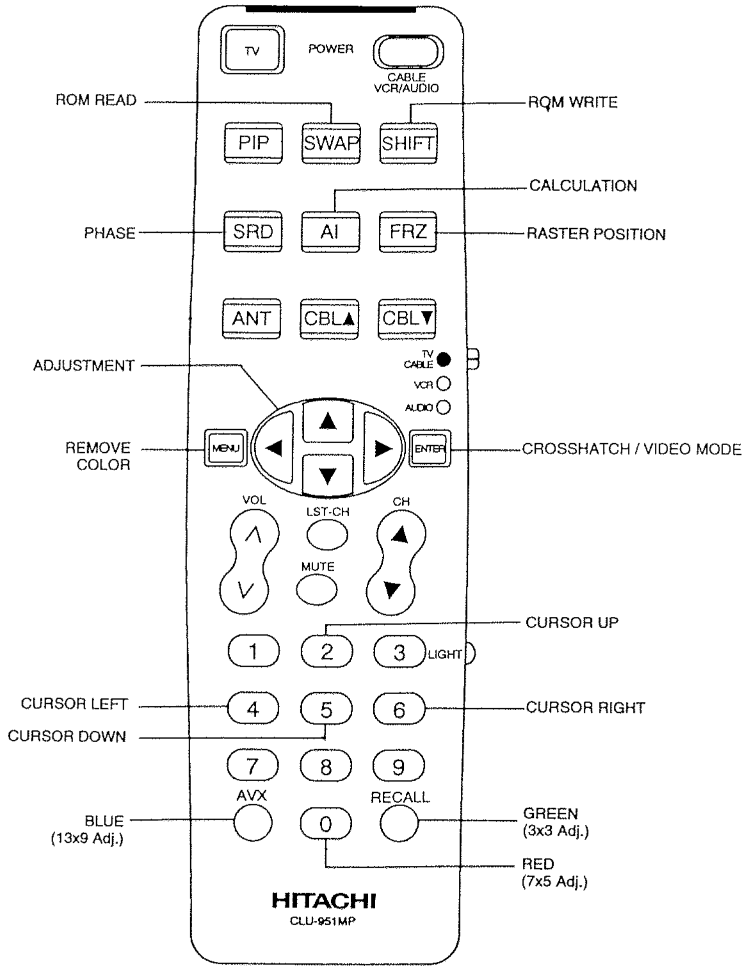
(1) Start adjustment at the center of the screen.
(2) Continue adjustment at next closest position.
(3) Adjust center area first, and ending with edge sections.
(4) Press the AI button to perform interpolation operation. This process will take about 15 seconds and no picture will be seen at this time.
(5) After interpolation, check convergence again and repeat (1)-(5) if necessary.
(6) When convergence is acceptable, press SHIFT to write data to ROM memory. ROM WRITE? is displayed to alarm system that ROM will be overwritten with new data. Press the SHIFT button again to write displayed data to ROM.
(7) DATA WRITE TO ROM will take approximately 20 seconds and no picture will be displayed.
(8) Green dots will be displayed when operation is complete.
(9) Press MUTE to return to convergence pattern, then confirm again convergence is acceptable.

Notes: (1) Display only green for easier adjustment and match to jig screen. Press "MENU", THEN PRESS "RECALL".
(2) Perform interpolation and data write to ROM after

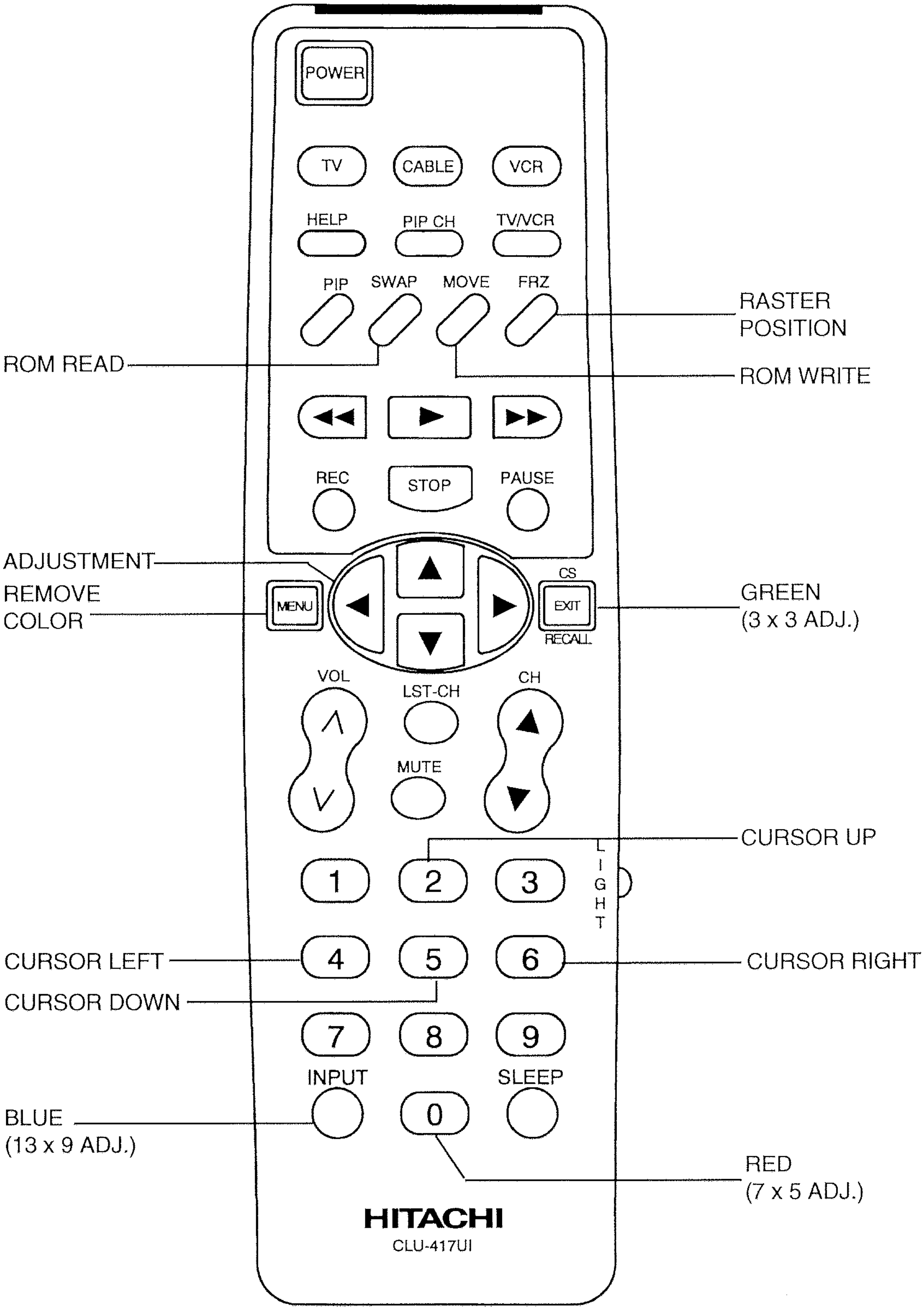
green adjustment. Once green has been confirmed to match jig screen, the jig screen can be removed. Do not readjust the green color after jig screen has been removed. This is now your reference color.

(3) Display green and red only and match red to green.
(4) Display all colors and match blue to green and red. Touch-up red color if necessary.
(5) Existing DATA in ROM can be read by pressing the SWAP button 2 times. This data can be used after replacing a component (CRT, DY, etc.) Where complete convergence adjustment is not necessary be careful not to overwrite this data.
DO NOT write cleared RAM data into ROM or a complete convergence adjustment will be necessary.

2.16.4. Digital Convergence Remote Control


ROM READ
ROM WRITE
TV
POWER
CABLE VCR/AUDIO
PIP
SWAP
SHIFT
CALCULATION
PHASE
SRD
AI
FRZ
RASTER POSITION
ANT
CBL▲
CBL▼
ADJUSTMENT
TV CABLE
VCR
AUDIO
REMOVE COLOR
MENU
ENTER
CROSSHATCH / VIDEO MODE
VOL
LST-CH
CH
MUTE
CURSOR UP
1
2
3
LIGHT
CURSOR LEFT
4
5
6
CURSOR RIGHT
CURSOR DOWN
7
8
9
AVX
RECALL
BLUE (13x9 Adj.)
0
GREEN (3x3 Adj.)
RED (7x5 Adj.)
HITACHI
CLU-951MP

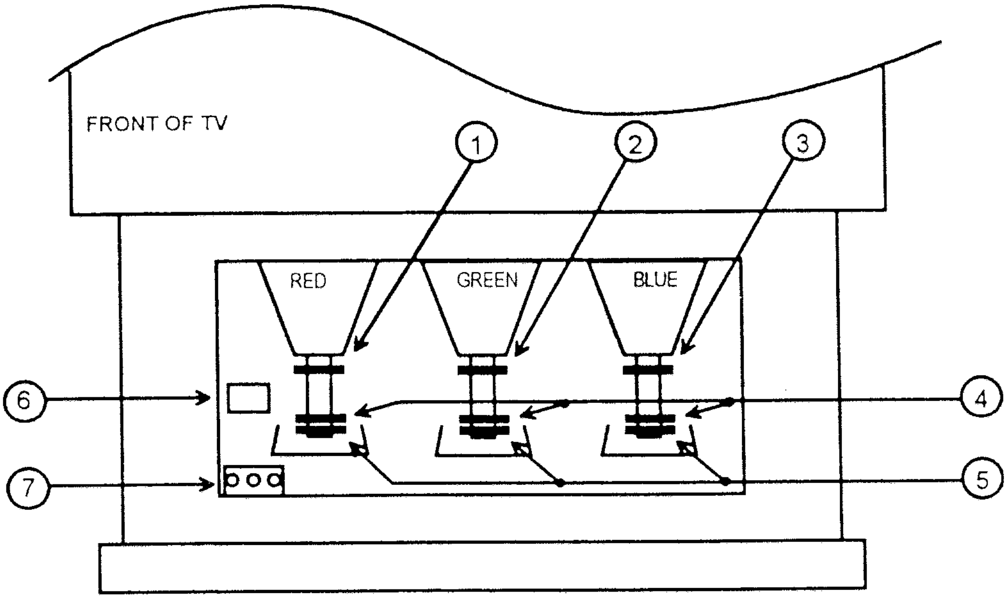
2.16.4. Digital convergence remote control


POWER
TV
CABLE
VCR
HELP
PIP CH
TV/VCR
PIP
SWAP
MOVE
FRZ
RASTER POSITION
ROM READ
ROM WRITE
REC
STOP
PAUSE
ADJUSTMENT
REMOVE COLOR
MENU
CS
EXIT
RECALL
GREEN (3 x 3 ADJ.)
VOL
LST-CH
CH
MUTE
CURSOR UP
1
2
3
LIGHT
CURSOR LEFT
4
5
6
CURSOR RIGHT
CURSOR DOWN
7
8
9
INPUT
SLEEP
BLUE (13 x 9 ADJ.)
0
RED (7 x 5 ADJ.)
HITACHI
CLU-417UI

Note: Digital Convergence Adjustment procedures (2.16) were described for use with a CLU-951MP remote control. It is not possible to make Phase Adjustment (2.16.1) using the CLU-417UI remote control. If phase adjustment is necessary, please use the CLU-951MP remote control.

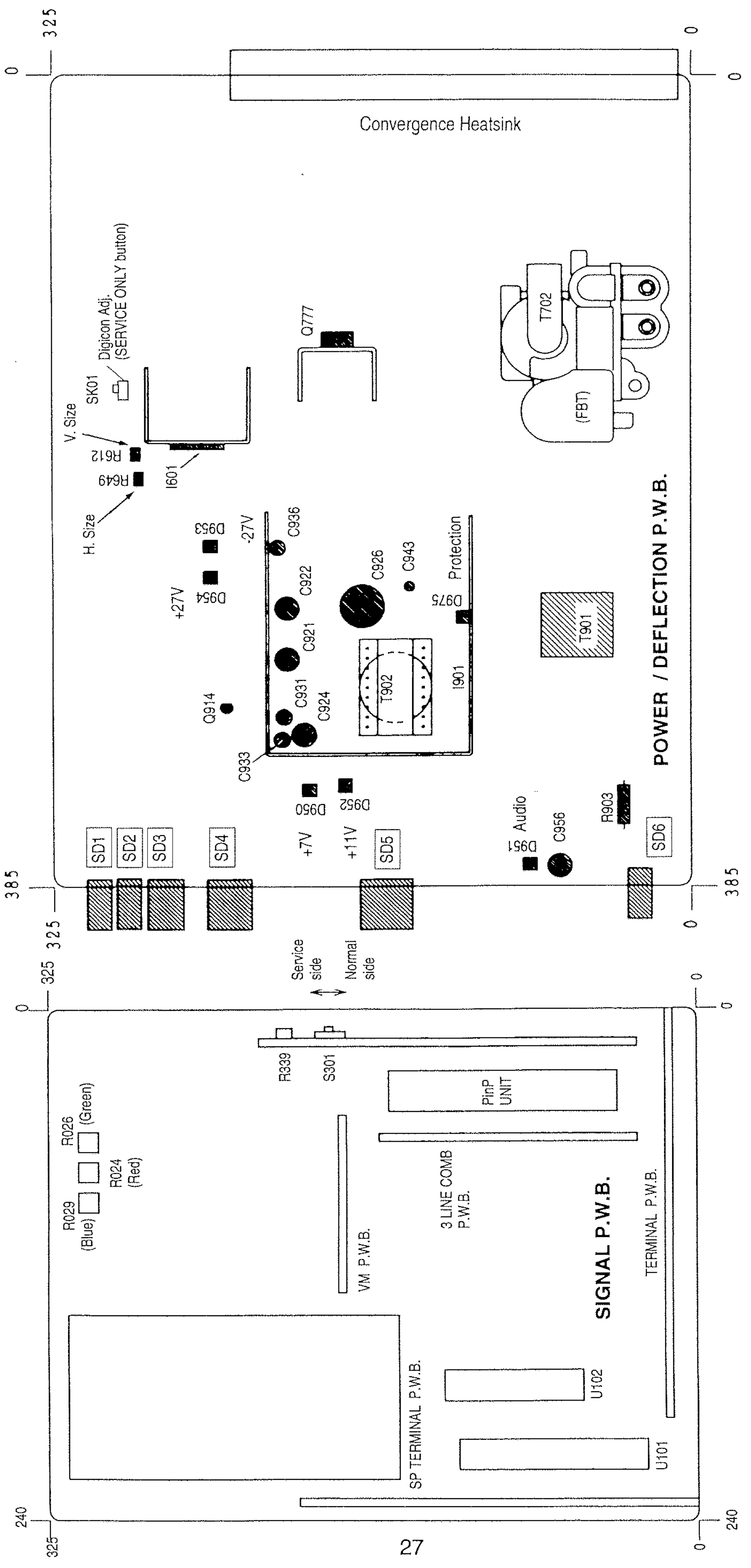
3. ADJUSTMENT POINT

3.1 CRT, cabinet locations

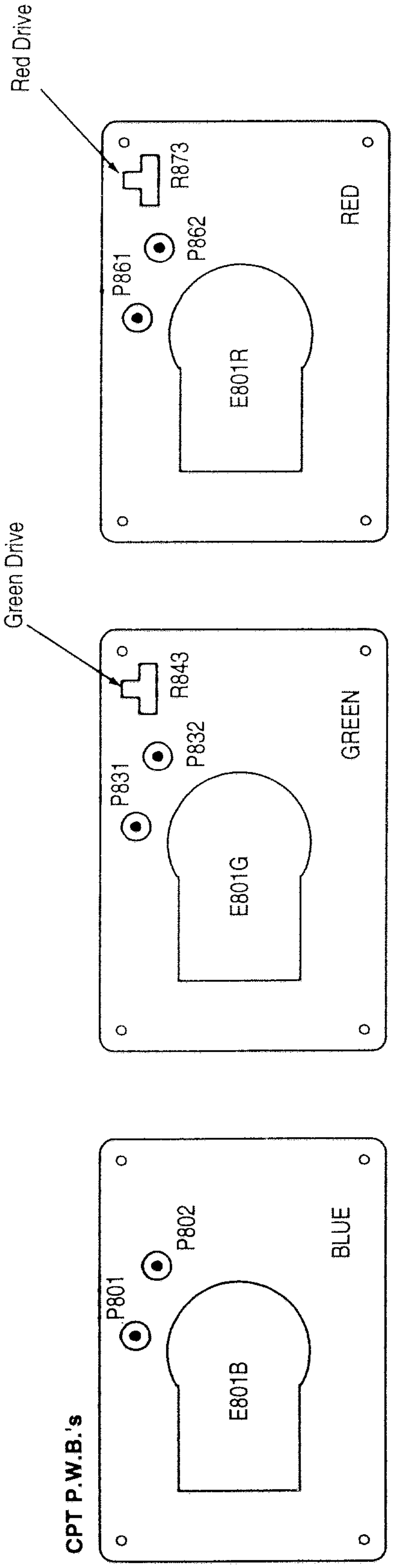


1. CENTERING MAGNET FOR RED PRT
2. CENTERING MAGNET FOR GREEN PRT
3. CENTERING MAGNET FOR BLUE PRT
4. 4-POLE MAGNET FOR BEAM FORM ADJUSTMENT
5. BEAM ALIGNMENT MAGNET
6. DIGITAL CONVERGENCE MODULE
7. FOCUS PACK (TOP ADJUSTMENTS FOR FOCUS, BOTTOM FOR SCREEN)

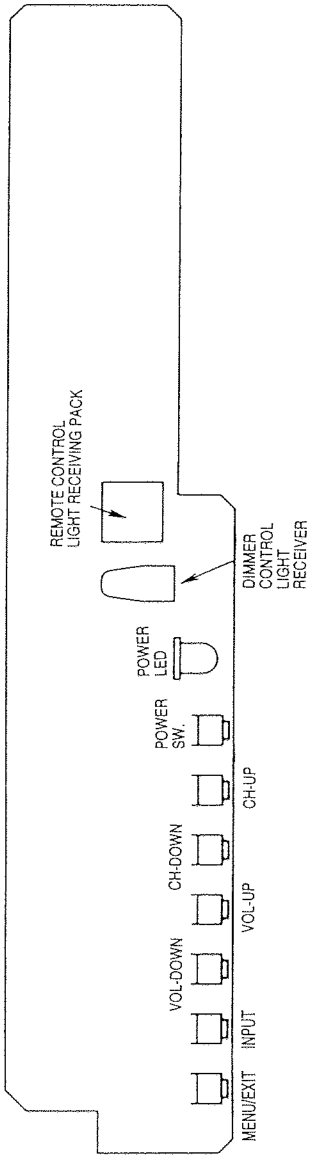
3.2 Signal PWB, Power/Deflection P.W.B. adjustment points


Convergence Heatsink
Digicon Adj.
(SERVICE ONLY button)
SK01
V. Size
H. Size
R612
R649
I601
Q777
T702
(FBT)
D953
-27V
C936
+27V
D954
C922
C926
C943
Protection
D975
C921
T901
Q914
C931
C924
T902
I901
C933
D950
D952
Audio
C956
D951
R903
POWER / DEFLECTION P.W.B.
SD1
SD2
SD3
SD4
+7V
+11V
SD5
SD6
Service side
Normal side
R339
S301
PinP UNIT
R026
(Green)
R024
(Red)
R029
(Blue)
3 LINE COMB P.W.B.
VM P.W.B.
SIGNAL P.W.B.
TERMINAL P.W.B.
SP TERMINAL P.W.B.
U102
U101
325
0
385
240

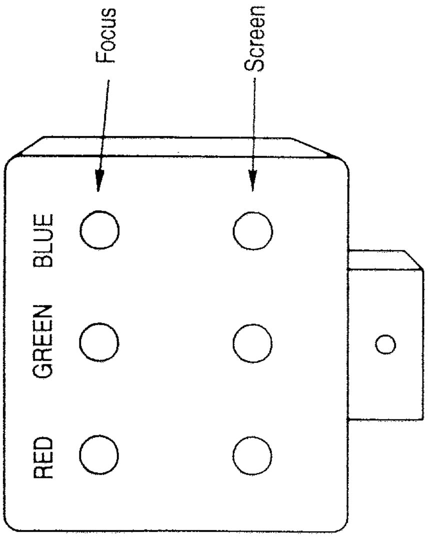
3.3 CPT, Control P.W.B., Focus Pack adjustment points


Red Drive
R873
P862
P861
RED
E801R
Green Drive
R843
P832
P831
GREEN
E801G
P802
P801
BLUE
E801B

CPT P.W.B.'s


REMOTE CONTROL LIGHT RECEIVING PACK
DIMMER CONTROL LIGHT RECEIVER
POWER LED
POWER SW.
CH-UP
CH-DOWN
VOL-UP
VOL-DOWN
INPUT
MENU/EXIT

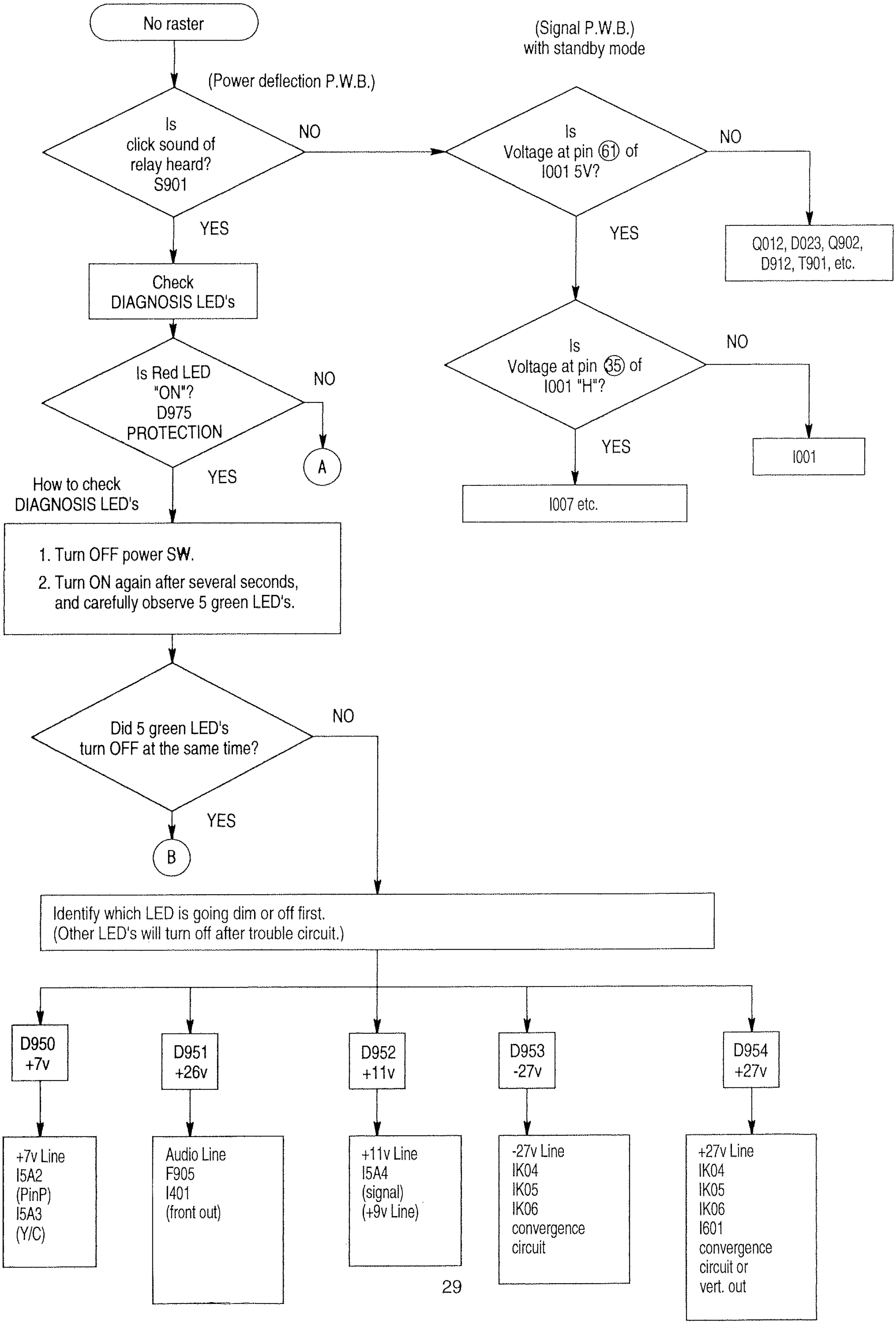
CONTROL P.W.B.

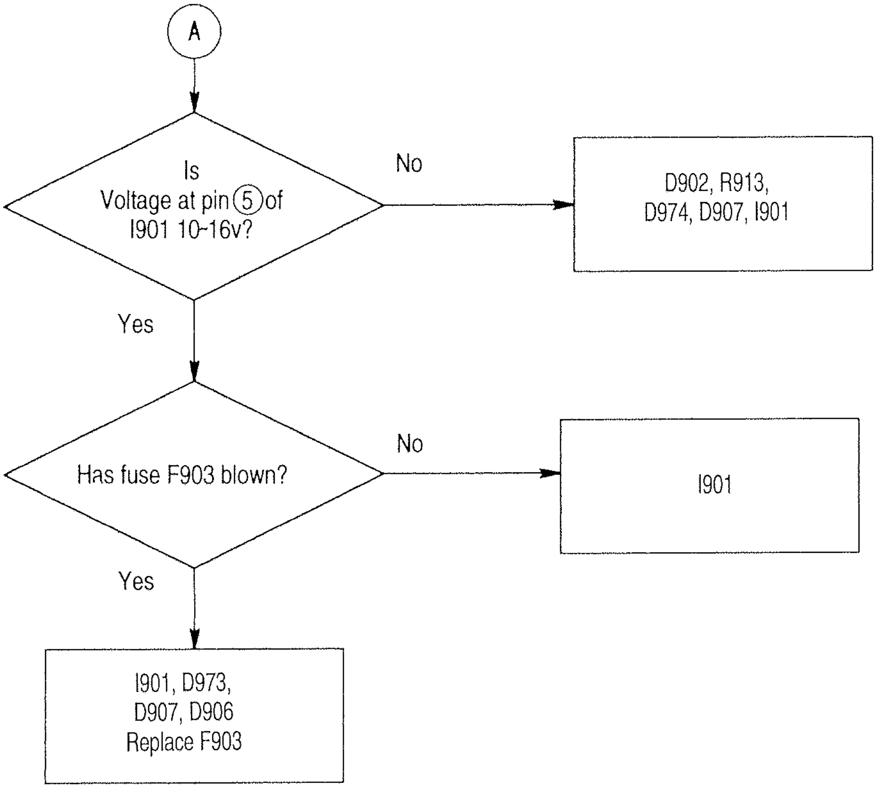

Focus
Screen
RED
GREEN
BLUE

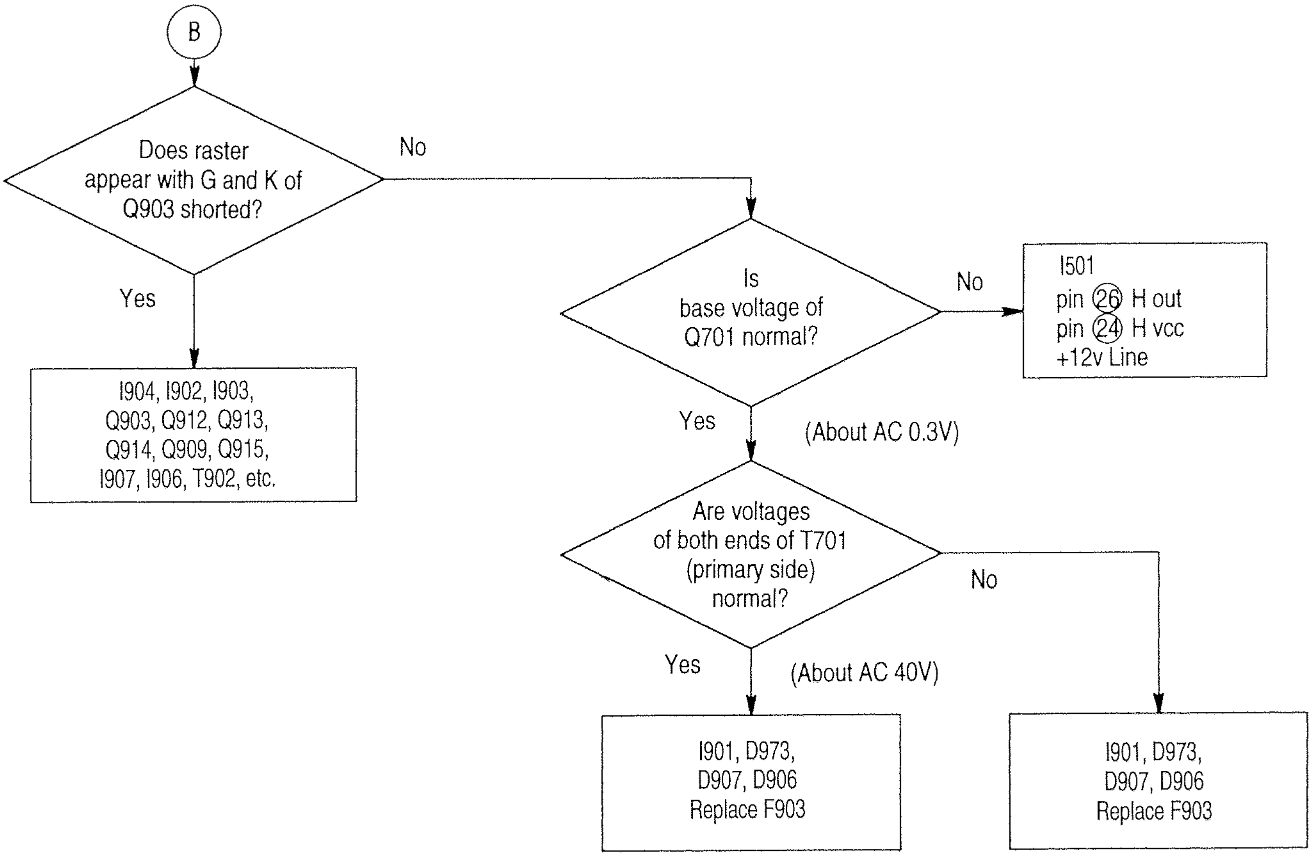
FOCUS PACK

TROUBLESHOOTING

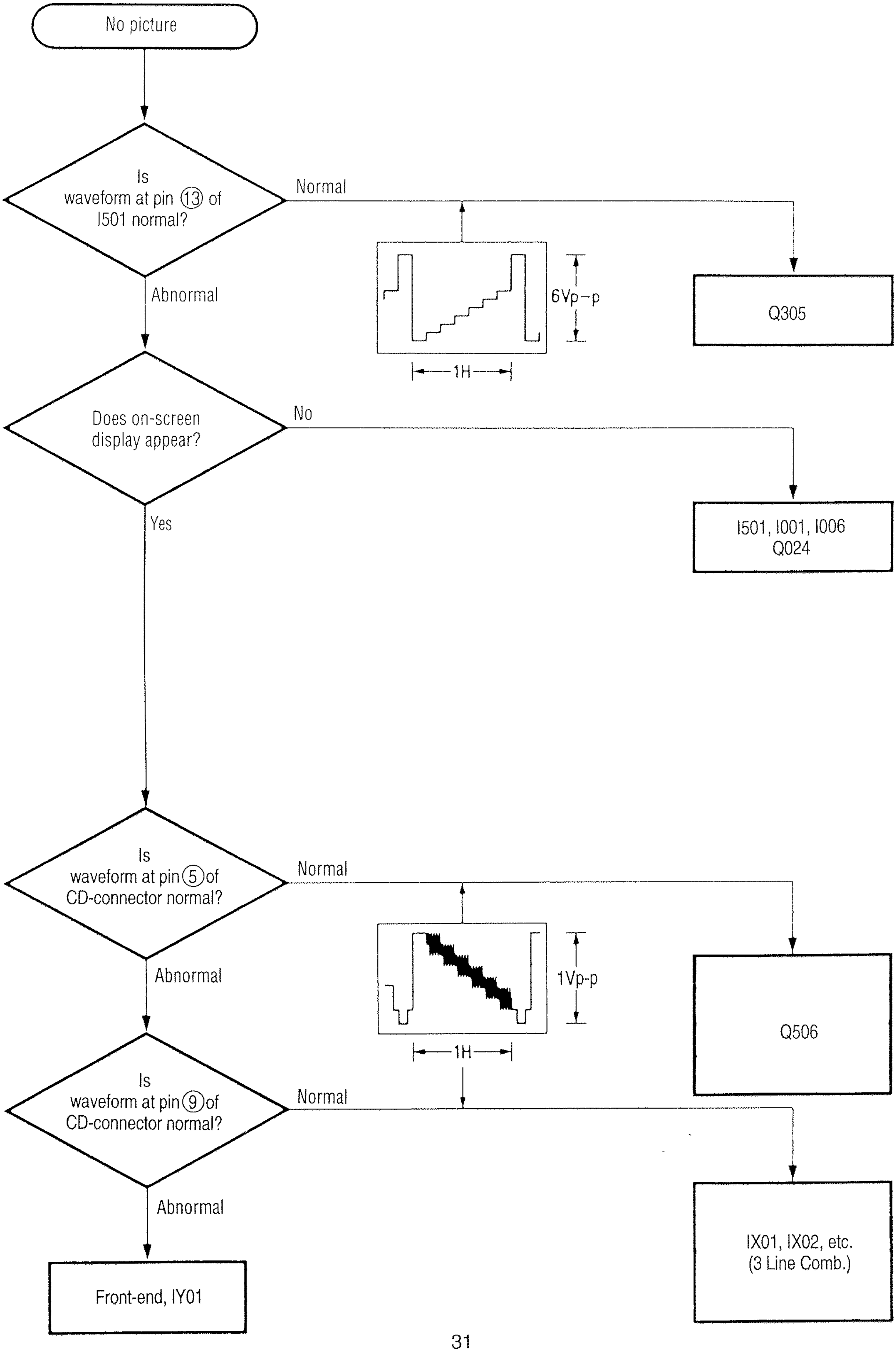
1. No raster


No raster
(Power deflection P.W.B.)
Is click sound of relay heard? S901
NO
YES
Check DIAGNOSIS LED's
Is Red LED "ON"? D975 PROTECTION
NO
A
YES
How to check DIAGNOSIS LED's
1. Turn OFF power SW.
2. Turn ON again after several seconds, and carefully observe 5 green LED's.
Did 5 green LED's turn OFF at the same time?
NO
YES
B
Identify which LED is going dim or off first.
(Other LED's will turn off after trouble circuit.)
(Signal P.W.B.) with standby mode
Is Voltage at pin ⑥① of I001 5V?
NO
Q012, D023, Q902, D912, T901, etc.
YES
Is Voltage at pin ③⑤ of I001 "H"?
NO
I001
YES
I007 etc.
D950 +7v
+7v Line I5A2 (PinP) I5A3 (Y/C)
D951 +26v
Audio Line F905 I401 (front out)
D952 +11v
+11v Line I5A4 (signal) (+9v Line)
D953 -27v
-27v Line IK04 IK05 IK06 convergence circuit
D954 +27v
+27v Line IK04 IK05 IK06 I601 convergence circuit or vert. out

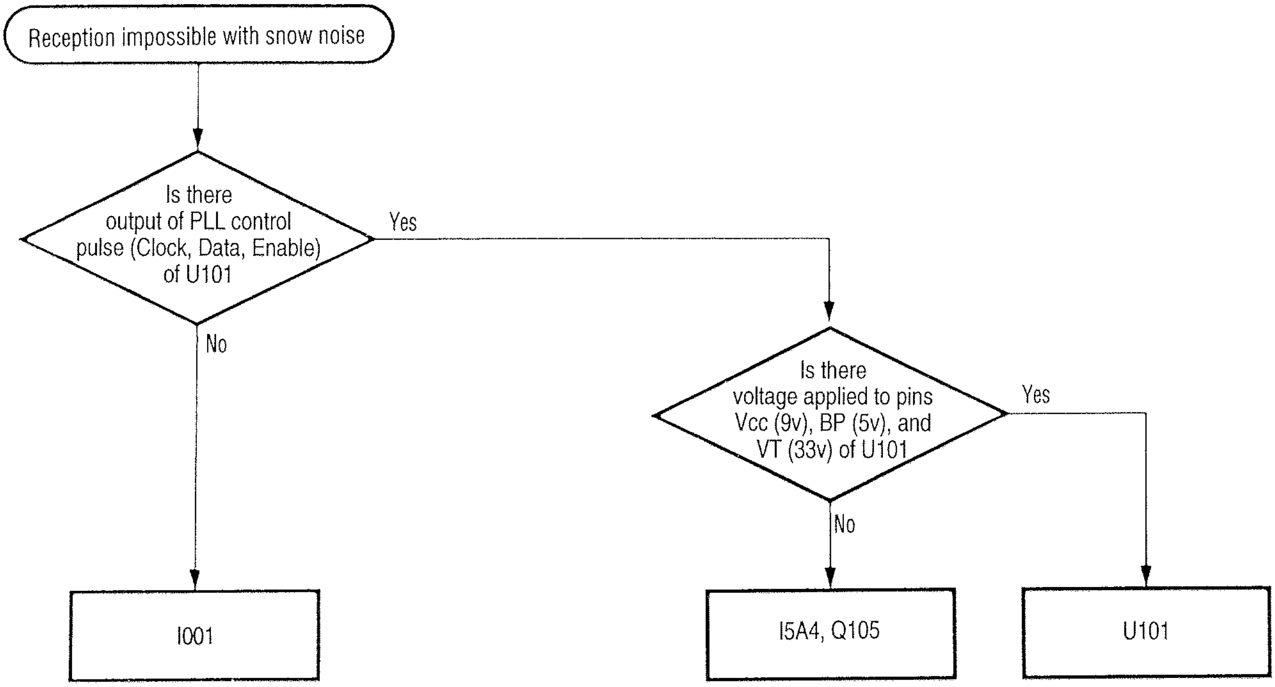

A
Is Voltage at pin ⑤ of I901 10-16v?
No
D902, R913, D974, D907, I901
Yes
Has fuse F903 blown?
No
I901
Yes
I901, D973, D907, D906 Replace F903


B
Does raster appear with G and K of Q903 shorted?
No
Yes
I904, I902, I903, Q903, Q912, Q913, Q914, Q909, Q915, I907, I906, T902, etc.
Is base voltage of Q701 normal?
No
I501
pin ㉖ H out
pin ㉔ H vcc
+12v Line
Yes
(About AC 0.3V)
Are voltages of both ends of T701 (primary side) normal?
No
Yes
(About AC 40V)
I901, D973, D907, D906 Replace F903
I901, D973, D907, D906 Replace F903

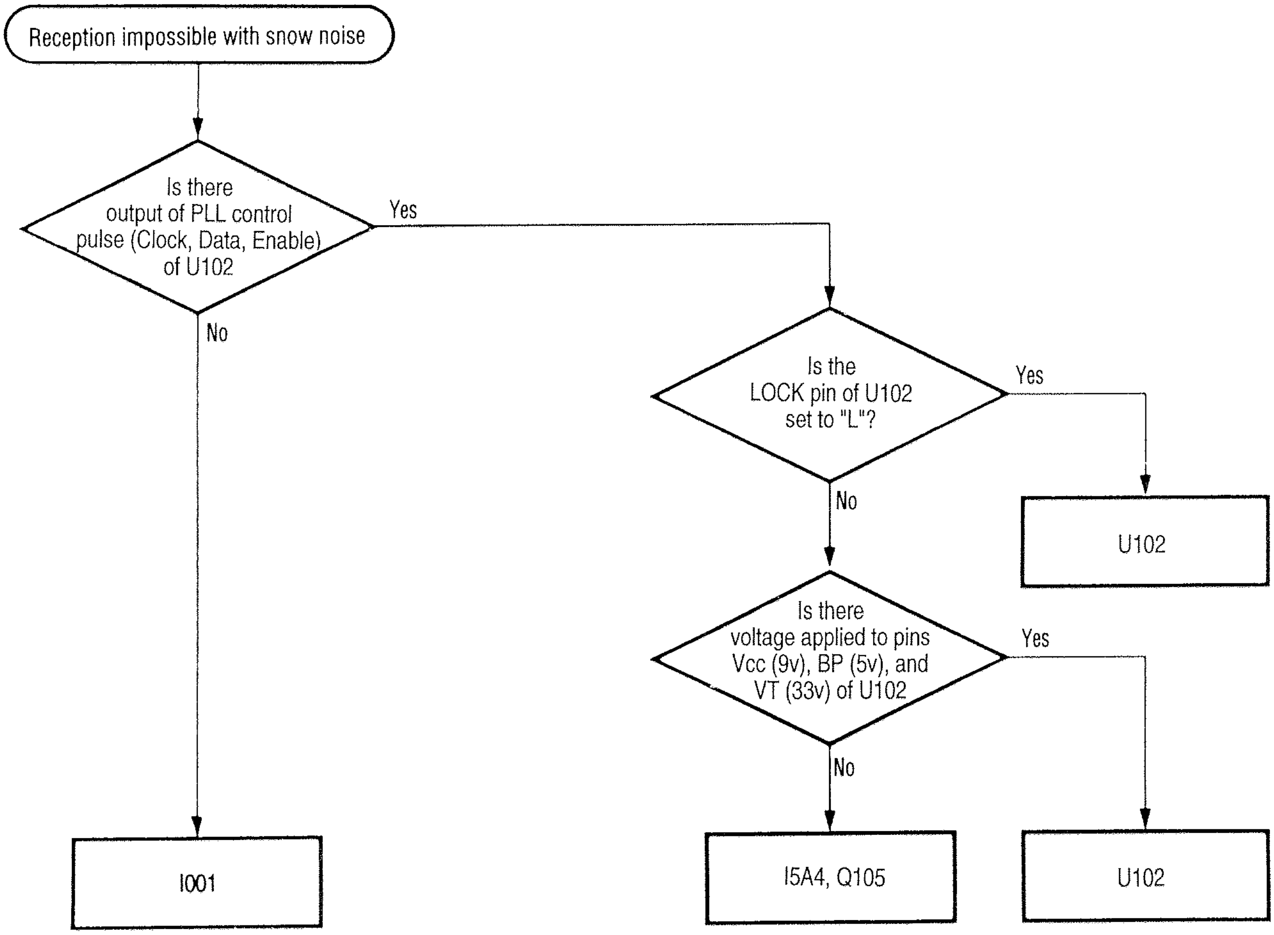
2. No picture


No picture
Is waveform at pin ⑬ of I501 normal?
Normal
Abnormal
6Vp−p
1H
Q305
Does on-screen display appear?
No
Yes
I501, I001, I006
Q024
Is waveform at pin ⑤ of CD-connector normal?
Normal
Abnormal
1Vp-p
1H
Q506
Is waveform at pin ⑨ of CD-connector normal?
Normal
Abnormal
Front-end, IY01
IX01, IX02, etc.
(3 Line Comb.)

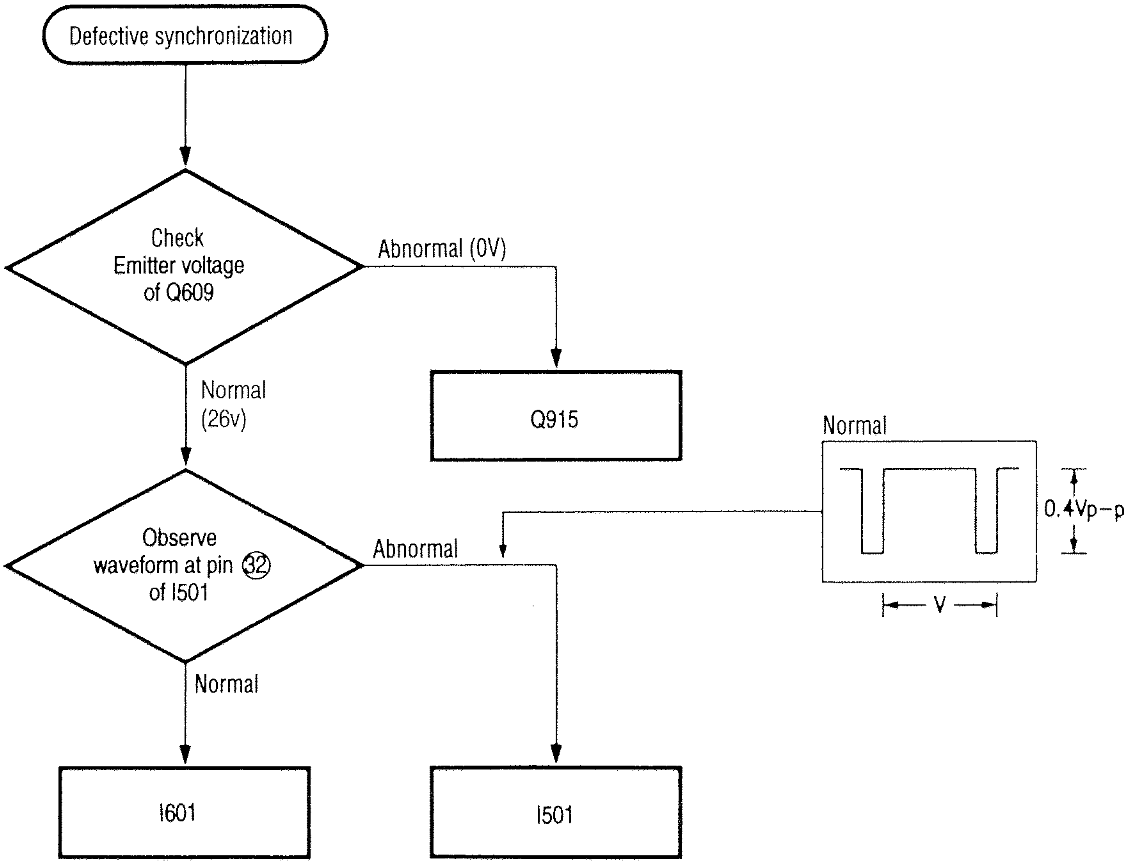
3. Reception impossible with snow noise
ANT A - Green Channel OSD


Reception impossible with snow noise
Is there output of PLL control pulse (Clock, Data, Enable) of U101
Yes
No
Is there voltage applied to pins Vcc (9v), BP (5v), and VT (33v) of U101
Yes
No
I001
I5A4, Q105
U101

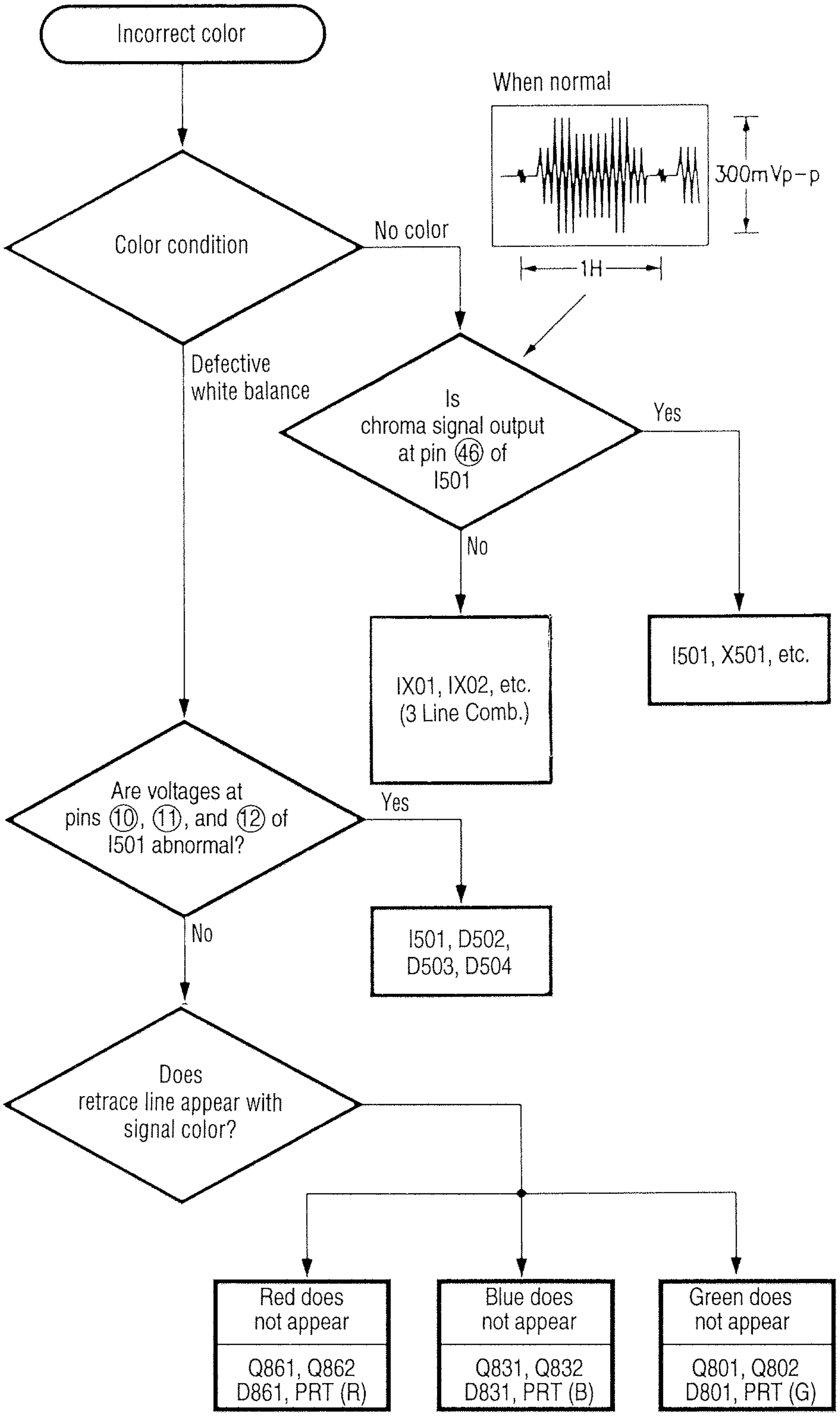
ANT B - Yellow Channel OSD


Reception impossible with snow noise
Is there output of PLL control pulse (Clock, Data, Enable) of U102
Yes
No
Is the LOCK pin of U102 set to "L"?
Yes
No
U102
Is there voltage applied to pins Vcc (9v), BP (5v), and VT (33v) of U102
Yes
No
I001
I5A4, Q105
U102

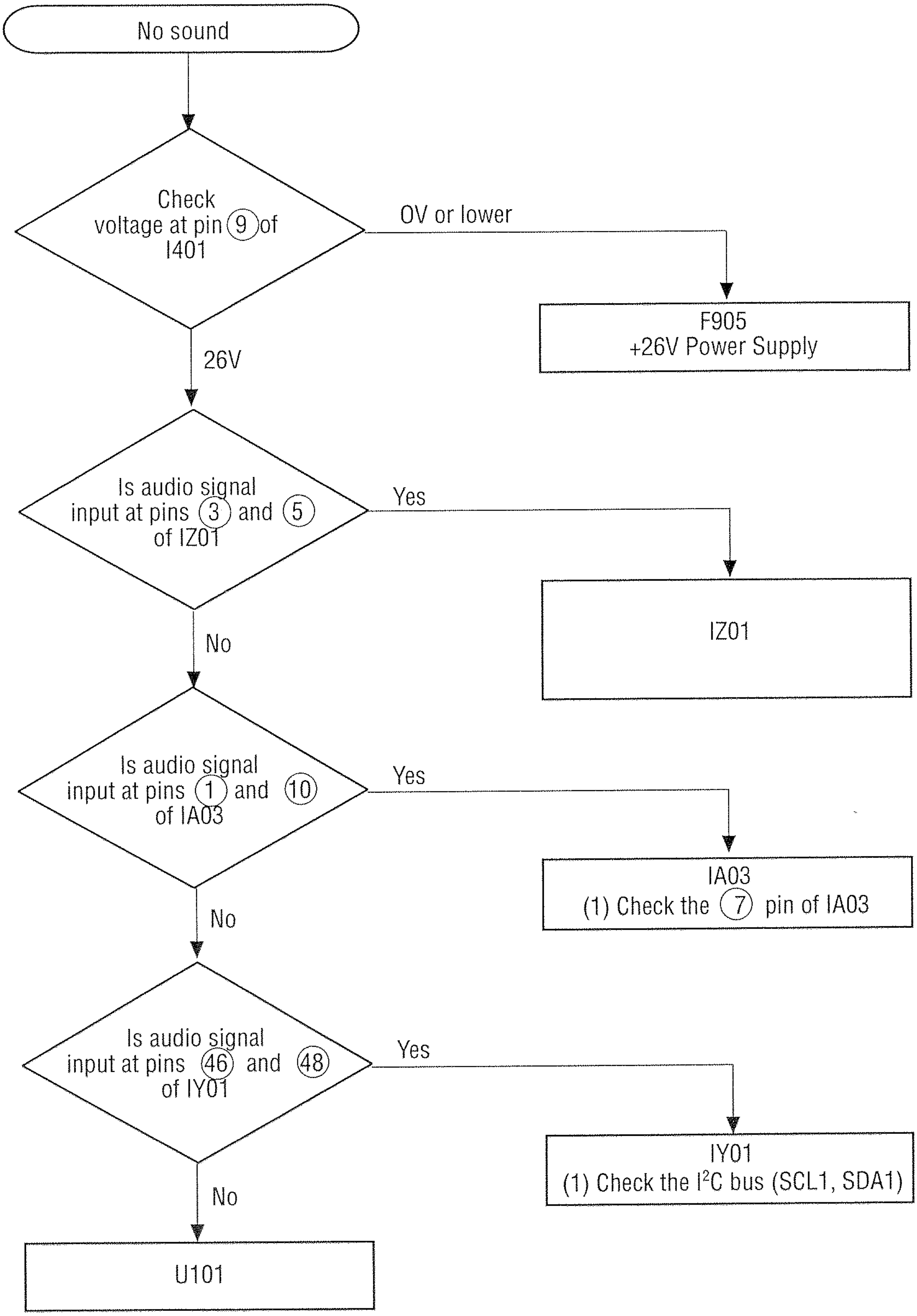
4. Defective synchronization


Defective synchronization
Check Emitter voltage of Q609
Abnormal (0V)
Q915
Normal (26v)
Observe waveform at pin ㉜ of I501
Abnormal
Normal
I601
I501
Normal
0.4Vp−p
V

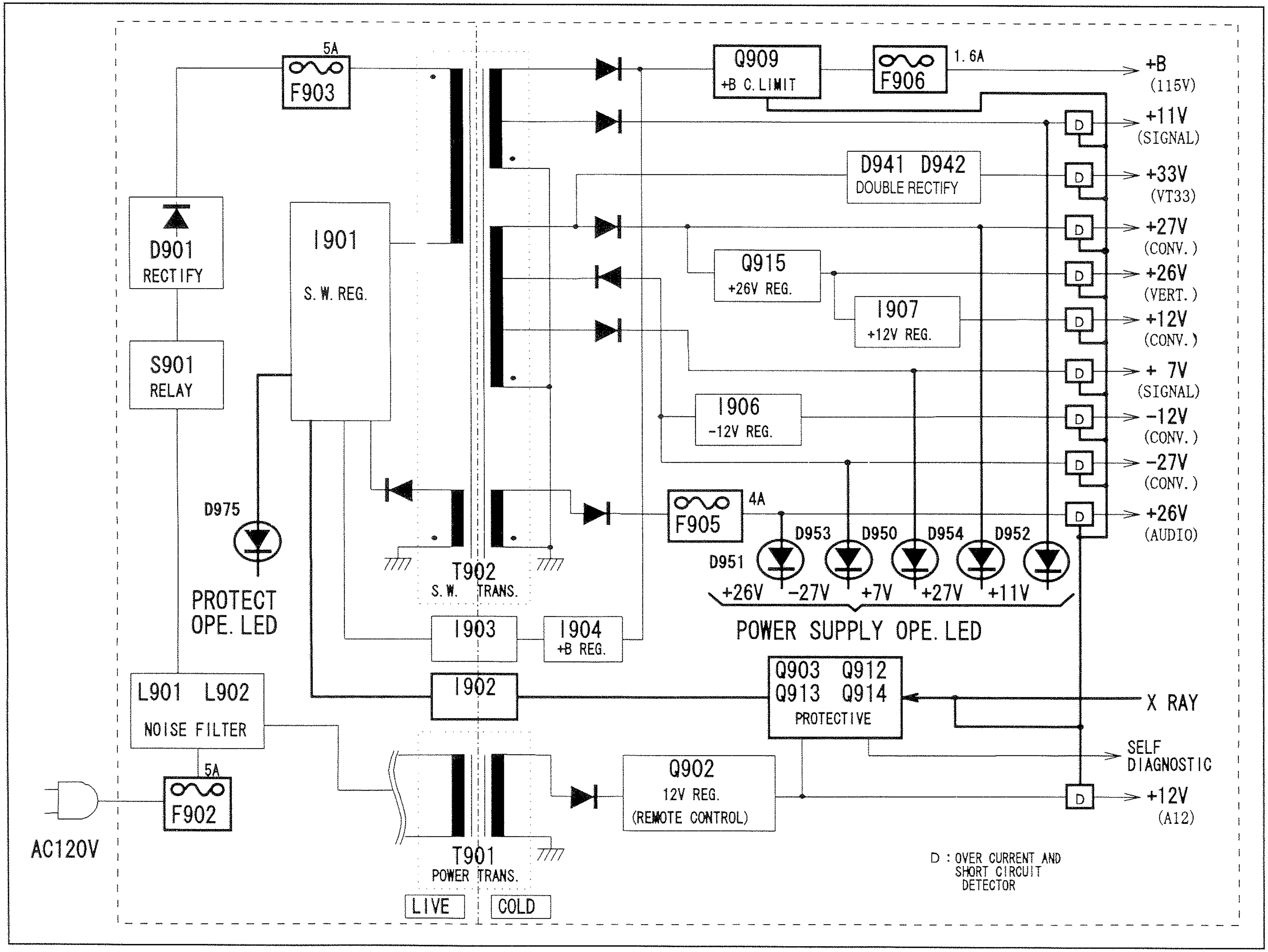
5. Incorrect color


Incorrect color
Color condition
No color
Defective white balance
When normal
300mVp-p
1H
Is chroma signal output at pin ㊻ of I501
Yes
No
IX01, IX02, etc. (3 Line Comb.)
I501, X501, etc.
Are voltages at pins ⑩, ⑪, and ⑫ of I501 abnormal?
Yes
No
I501, D502, D503, D504
Does retrace line appear with signal color?
Red does not appear
Q861, Q862 D861, PRT (R)
Blue does not appear
Q831, Q832 D831, PRT (B)
Green does not appear
Q801, Q802 D801, PRT (G)

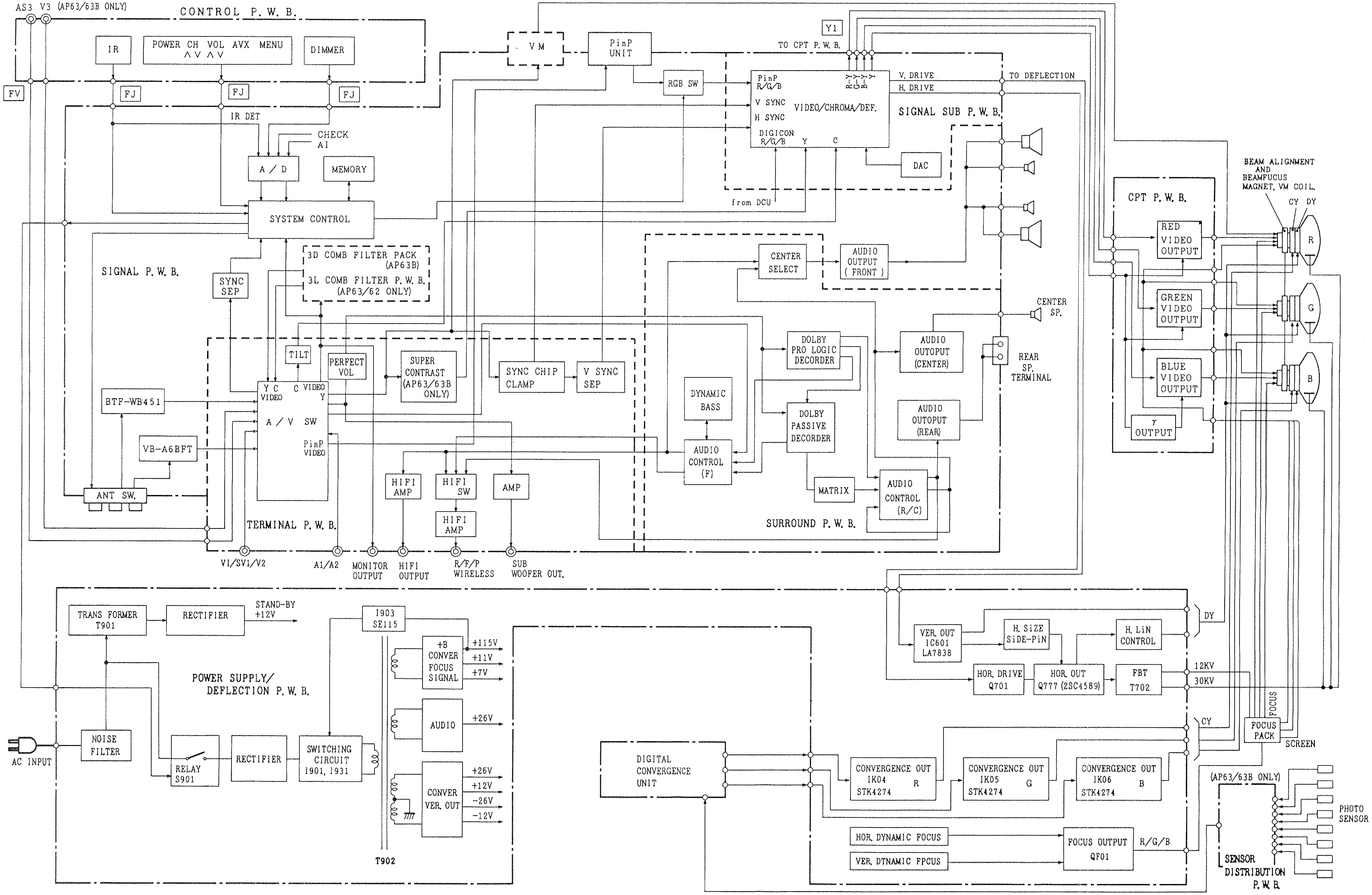
6. No sound


No sound
Check voltage at pin ⑨ of I401
0V or lower
F905 +26V Power Supply
26V
Is audio signal input at pins ③ and ⑤ of IZ01
Yes
IZ01
No
Is audio signal input at pins ① and ⑩ of IA03
Yes
IA03 (1) Check the ⑦ pin of IA03
No
Is audio signal input at pins (46) and (48) of IY01
Yes
IY01 (1) Check the I²C bus (SCL1, SDA1)
No
U101

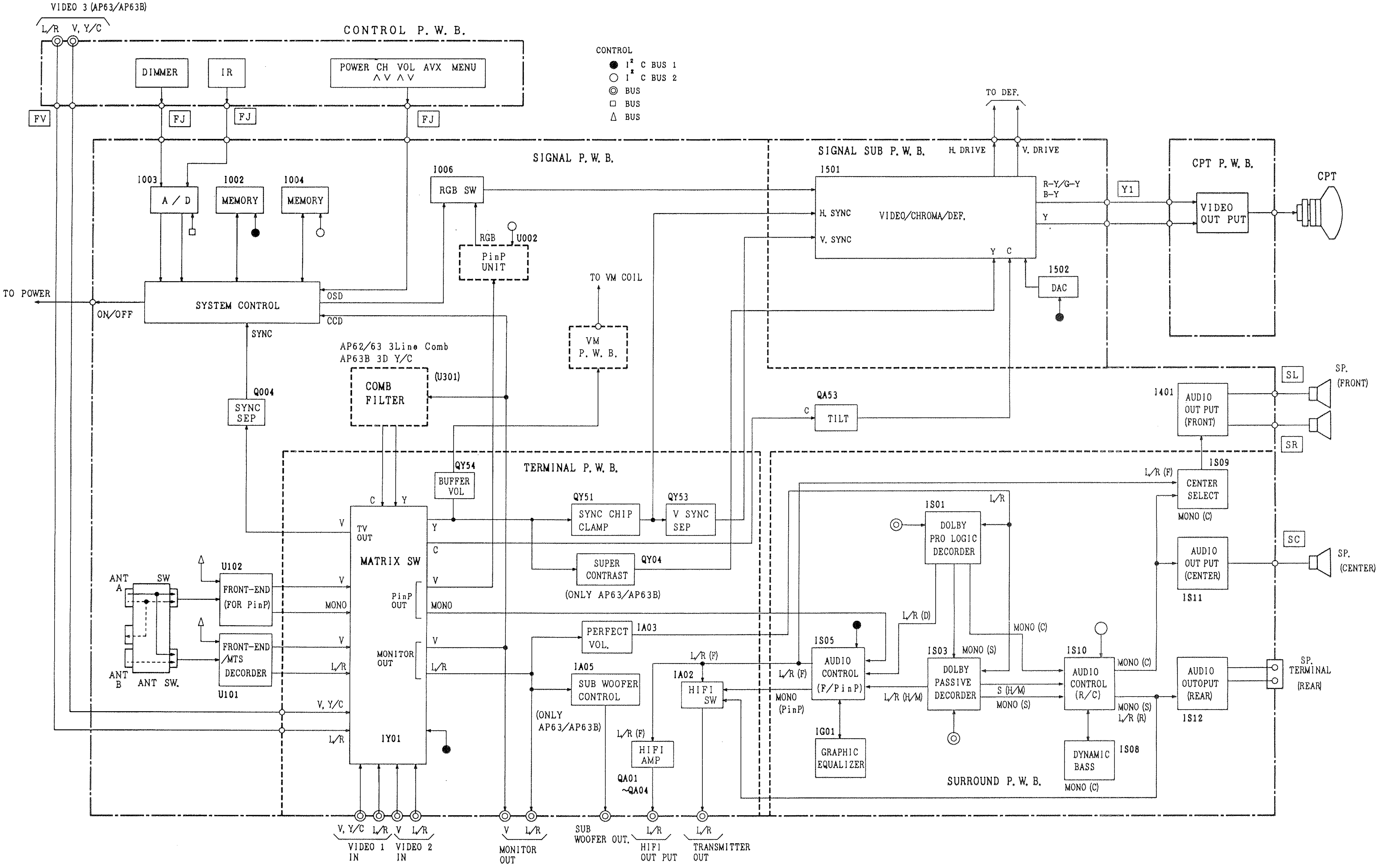
PROTECTION CIRCUIT BLOCK DIAGRAM


5A
F903
D901
RECTIFY
S901
RELAY
I901
S.W. REG.
D975
PROTECT
OPE. LED
T902
S.W. TRANS.
I903
I904
+B REG.
I902
L901 L902
NOISE FILTER
5A
F902
AC120V
T901
POWER TRANS.
LIVE
COLD
Q909
+B C.LIMIT
F906
1.6A
+B
(115V)
+11V
(SIGNAL)
D941 D942
DOUBLE RECTIFY
+33V
(VT33)
+27V
(CONV.)
Q915
+26V REG.
+26V
(VERT.)
I907
+12V REG.
+12V
(CONV.)
+ 7V
(SIGNAL)
I906
-12V REG.
-12V
(CONV.)
-27V
(CONV.)
F905
4A
+26V
(AUDIO)
D951
D953
D950
D954
D952
+26V
-27V
+7V
+27V
+11V
POWER SUPPLY OPE. LED
Q903 Q912
Q913 Q914
PROTECTIVE
X RAY
SELF
DIAGNOSTIC
Q902
12V REG.
(REMOTE CONTROL)
+12V
(A12)
D
D : OVER CURRENT AND
SHORT CIRCUIT
DETECTOR

BLOCK DIAGRAM (1/2)

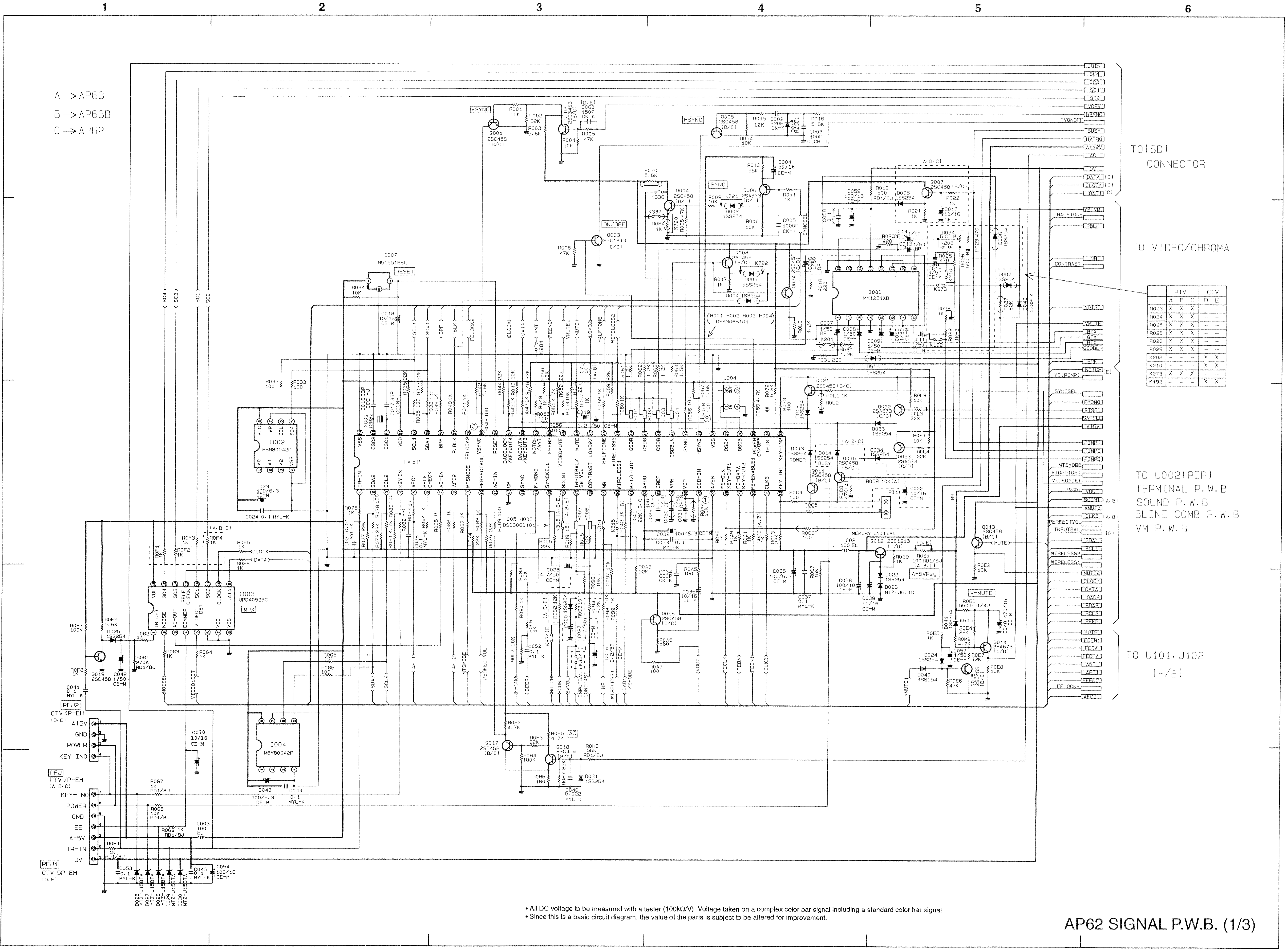

AS3 V3 (AP63/63B ONLY)
CONTROL P. W. B.
IR
POWER CH VOL AVX MENU
∧ ∨ ∧ ∨
DIMMER
FV
FJ
FJ
FJ
IR DET
CHECK
AI
A / D
MEMORY
SYSTEM CONTROL
SIGNAL P. W. B.
SYNC SEP
3D COMB FILTER PACK (AP63B)
3L COMB FILTER P. W. B. (AP63/62 ONLY)
TILT
PERFECT VOL
SUPER CONTRAST (AP63/63B ONLY)
SYNC CHIP CLAMP
V SYNC SEP
Y C VIDEO
C VIDEO Y
A / V SW
PinP VIDEO
BTF-WB451
VB-A6BFT
ANT SW.
HIFI AMP
HIFI SW
AMP
HIFI AMP
TERMINAL P. W. B.
V1/SV1/V2
A1/A2
MONITOR OUTPUT
HIFI OUTPUT
R/F/P WIRELESS
SUB WOOFER OUT.
V M
PinP UNIT
Y1
TO CPT P. W. B.
RGB SW
PinP R/G/B
V SYNC
H SYNC
VIDEO/CHROMA/DEF.
DIGICON R/G/B Y C
R G B
V. DRIVE
H. DRIVE
TO DEFLECTION
SIGNAL SUB P. W. B.
DAC
from DCU
CENTER SELECT
AUDIO OUTPUT (FRONT)
CENTER SP.
DOLBY PRO LOGIC DECORDER
AUDIO OUTOPUT (CENTER)
REAR SP. TERMINAL
DYNAMIC BASS
DOLBY PASSIVE DECORDER
AUDIO OUTOPUT (REAR)
AUDIO CONTROL (F)
MATRIX
AUDIO CONTROL (R/C)
SURROUND P. W. B.
BEAM ALIGNMENT AND BEAMFUCUS MAGNET, VM COIL.
CY DY
CPT P. W. B.
RED VIDEO OUTPUT
GREEN VIDEO OUTPUT
BLUE VIDEO OUTPUT
γ OUTPUT
R
G
B
TRANS FORMER T901
RECTIFIER
STAND-BY +12V
I903 SE115
+B CONVER FOCUS SIGNAL
+115V
+11V
+7V
POWER SUPPLY/ DEFLECTION P. W. B.
AUDIO
+26V
NOISE FILTER
AC INPUT
RELAY S901
RECTIFIER
SWITCHING CIRCUIT I901, I931
CONVER VER. OUT
+26V
+12V
-26V
-12V
T902
VER. OUT IC601 LA7838
H. SIZE SIDE-PIN
H. LIN CONTROL
DY
HOR. DRIVE Q701
HOR. OUT Q777 (2SC4589)
FBT T702
12KV
30KV
FOCUS
FOCUS PACK
SCREEN
CY
DIGITAL CONVERGENCE UNIT
CONVERGENCE OUT IK04 STK4274 R
CONVERGENCE OUT IK05 STK4274 G
CONVERGENCE OUT IK06 STK4274 B
(AP63/63B ONLY)
PHOTO SENSOR
HOR. DYNAMIC FOCUS
VER. DTNAMIC FPCUS
FOCUS OUTPUT QF01
R/G/B
SENSOR DISTRIBUTION P. W. B.

BLOCK DIAGRAM (2/2)


VIDEO 3 (AP63/AP63B)
L/R
V, Y/C
CONTROL P. W. B.
DIMMER
IR
POWER CH VOL AVX MENU
∧∨ ∧∨
FV
FJ
FJ
FJ
CONTROL
● I² C BUS 1
○ I² C BUS 2
◎ BUS
□ BUS
△ BUS
TO DEF.
SIGNAL P. W. B.
SIGNAL SUB P. W. B.
H. DRIVE
V. DRIVE
CPT P. W. B.
CPT
I003
A / D
I002
MEMORY
I004
MEMORY
I006
RGB SW
RGB
U002
PinP UNIT
I501
H. SYNC
V. SYNC
VIDEO/CHROMA/DEF.
R-Y/G-Y
B-Y
Y
Y C
Y1
VIDEO OUT PUT
I502
DAC
TO POWER
ON/OFF
SYSTEM CONTROL
OSD
CCD
SYNC
TO VM COIL
VM P. W. B.
AP62/63 3Line Comb
AP63B 3D Y/C
COMB FILTER
(U301)
Q004
SYNC SEP
QA53
C
TILT
I401
AUDIO OUT PUT (FRONT)
SL
SR
SP. (FRONT)
TERMINAL P. W. B.
QY54
BUFFER VOL
C Y
V
TV OUT
MATRIX SW
Y
C
QY51
SYNC CHIP CLAMP
QY53
V SYNC SEP
QY04
SUPER CONTRAST
(ONLY AP63/AP63B)
L/R (F)
IS09
CENTER SELECT
MONO (C)
IS01
DOLBY PRO LOGIC DECORDER
L/R
SC
AUDIO OUT PUT (CENTER)
IS11
SP. (CENTER)
ANT A
SW
U102
FRONT-END (FOR PinP)
V
MONO
PinP OUT
V
MONO
ANT B
ANT SW.
FRONT-END /MTS DECORDER
U101
V
L/R
MONITOR OUT
V
L/R
V, Y/C
L/R
IY01
PERFECT VOL.
IA03
IA05
SUB WOOFER CONTROL
(ONLY AP63/AP63B)
IA02
HIFI SW
L/R (F)
L/R (F)
HIFI AMP
QA01 ~QA04
L/R (D)
MONO (C)
IS05
AUDIO CONTROL (F/PinP)
L/R (F)
MONO (PinP)
IS03
MONO (S)
DOLBY PASSIVE DECORDER
L/R (H/M)
S (H/M)
MONO (S)
IS10
AUDIO CONTROL (R/C)
MONO (C)
MONO (S)
L/R (R)
AUDIO OUTOPUT (REAR)
IS12
SP. TERMINAL (REAR)
IG01
GRAPHIC EQUALIZER
DYNAMIC BASS
IS08
MONO (C)
SURROUND P. W. B.
V, Y/C L/R V L/R
VIDEO 1 IN
VIDEO 2 IN
V L/R
MONITOR OUT
SUB WOOFER OUT.
L/R
HIFI OUT PUT
L/R
TRANSMITTER OUT

BASIC CIRCUIT DIAGRAM

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.


1
2
3
4
5
6
A
B
C
D
E
A → AP63
B → AP63B
C → AP62
TO(SD) CONNECTOR
TO VIDEO/CHROMA
TO U002(PIP) TERMINAL P.W.B SOUND P.W.B 3LINE COMB P.W.B VM P.W.B
TO U101, U102 (F/E)
I001 TVμP
I002 M6M80042P
I003 UPD4052BC MPX
I004 M6M80042P
I006 MM1231XD
I007 M51951BSL RESET
VSYNC
HSYNC
SYNC
ON/OFF
AC
MEMORY INITIAL
A+5VReg
V-MUTE
PFJ2 CTV 4P-EH (D·E)
A+5V
GND
POWER
KEY-INO
PFJ PTV 7P-EH (A·B·C)
KEY-INO
POWER
GND
EE
A+5V
IR-IN
9V
PFJ1 CTV 5P-EH (D·E)
IRIN
SC4
SC3
SC1
SC2
VDRV
HSYNC
TVONOFF
BUSY
HYPRO
AT12V
AC
5V
DATA
CLOCK
LOAD1
HALFTONE
YS(VM)
PBLK
CONTRAST
NR
NOISE
VMUTE
BPF
NOTCH
YS(PINP)
SYNCSEL
FMONO
STSEL
SAPSEL
AT5V
PINPR
PINPG
PINPB
MTSMODE
VIDEO1DET
VIDEO2DET
VOUT
SCONT
VMUTE
CLK3
PERFECTVOL
INPUTBAL
SDA1
SCL1
WIRELESS2
WIRELESS1
MUTE2
CLOCK
DATA
LOAD2
SDA2
SCL2
BEEP
MUTE
FEEN1
FEDA
FECLK
ANT
AFC1
FEEN2
FELOCK2
AFC2

	PTV			CTV	
	A	B	C	D	E
R023	X	X	X	–	–
R024	X	X	X	–	–
R025	X	X	X	–	–
R026	X	X	X	–	–
R028	X	X	X	–	–
R029	X	X	X	–	–
K208	–	–	–	X	X
K210	–	–	–	X	X
K273	X	X	X	–	–
K192	–	–	–	X	X

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

AP62 SIGNAL P.W.B. (1/3)

Circuit No.	Pin No.	Voltage VDC
I001	1	0.1
	2	5.0
	3	5.0
	4	5.0
	5	2.5
	6	0.5
	7	5.0
	8	2.4
	9	0
	10	0
	11	2.4
	12	0
	13	2.5
	14	0.1
	15	0
	16	0
	17	0
	18	7.1
	19	3.0
	20	5.0
	21	0
	22	5.0
	23	0
	24	1.3
	25	1.2
	26	2.1
	27	0
	28	4.8
	29	4.9
	30	0.2
	31	0
	32	5.0

Circuit No.	Pin No.	Voltage VDC
I001	33	3.8
	34	0
	35	5.0
	36	2.6
	37	2.7
	38	0
	39	4.3
	40	4.3
	41	0
	42	0
	43	0
	44	0
	45	0.1
	46	0
	47	0
	48	0.1
	49	0
	50	0
	51	1.0
	52	5.0
	53	5.0
	54	5.0
	55	4.9
	56	5.2
	57	0
	58	5.0
	59	5.0
	60	5.0
	61	5.0
	62	2.5
	63	2.4
	64	0

Circuit No.	Pin No.	Voltage VDC
I002	1	0
	2	0
	3	0
	4	0
	5	5.0
	6	5.0
	7	0
	8	5.0

Circuit No.	Pin No.	Voltage VDC
I003	1	0
	2	3.7
	3	5.0
	4	5.0
	5	0
	6	0
	7	0
	8	0
	9	5.0
	10	5.0
	11	0
	12	0
	13	0
	14	0
	15	0
	16	5.0

Circuit No.	Pin No.	Voltage VDC
I004	1	0
	2	0
	3	0
	4	0
	5	5.0
	6	5.0
	7	0
	8	5.0

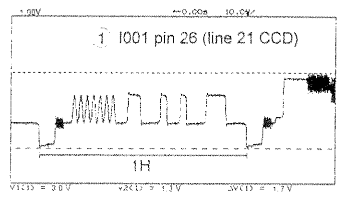
Circuit No.	Pin No.	Voltage VDC
I006	1	4.4
	2	0
	3	3.6
	4	0
	5	3.6
	6	3.6
	7	0
	8	4.4
	9	4.4
	10	0
	11	4.4
	12	0
	13	7.8
	14	4.4
	15	0
	16	4.4

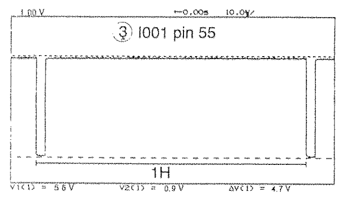
Circuit No.	Pin No.	Voltage VDC
I007	1	5.0
	2	0
	3	5.0

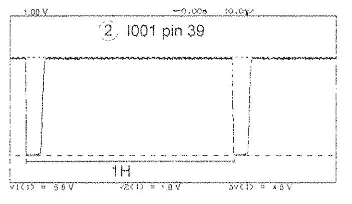
Circuit No.	Pin No.	Voltage VDC
Q001	B	0.1
	C	4.9
	E	0
Q002	B	0.6
	C	0.2
	E	0
Q003	B	0.7
	C	0.1
	E	0
Q004	B	0.1
	C	4.3
	E	0
Q005	B	-0.1
	C	4.3
	E	0
Q006	B	4.5
	C	0.4
	E	4.4
Q007	B	0
	C	5.0
	E	0
Q008	B	0
	C	5.0
	E	0
Q010	B	0
	C	5.0
	E	0.1

Circuit No.	Pin No.	Voltage VDC
Q011	B	0
	C	5.0
	E	0.1
Q012	B	5.7
	C	8.6
	E	5.1
Q013	B	0.1
	C	9.1
	E	0
Q014	B	12.5
	C	0
	E	12.5
Q015	B	0
	C	12.5
	E	0
Q016	B	3.8
	C	9.0
	E	3.1
Q017	B	0.6
	C	2.4
	E	0.2
Q018	B	0.4
	C	2.4
	E	0.2
Q019	B	0.7
	C	0.1
	E	0

Circuit No.	Pin No.	Voltage VDC
Q021	B	0
	C	3.8
	E	0.1
Q022	B	3.2
	C	3.8
	E	3.8
Q023	B	3.2
	C	3.8
	E	3.8
Q024	B	0
	C	5.0
	E	0

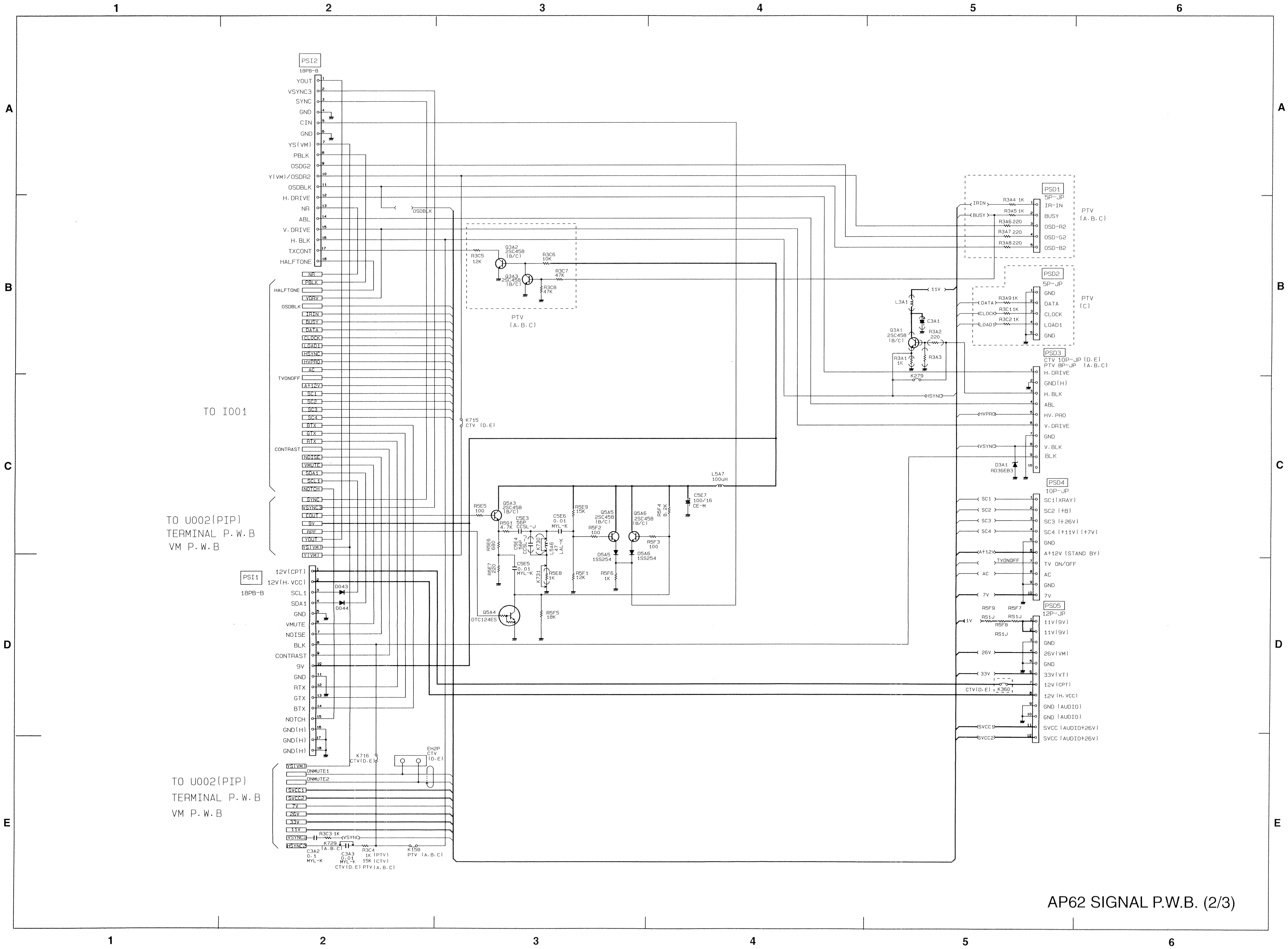

① I001 pin 26 (line 21 CCD)


③ I001 pin 55


② I001 pin 39

BASIC CIRCUIT DIAGRAM

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.


1
2
3
4
5
6
A
B
C
D
E
PSI2
18PB-B
YOUT
VSYNC3
SYNC
GND
CIN
GND
YS(VM)
PBLK
OSDG2
Y(VM)/OSDR2
OSDBLK
H.DRIVE
NR
ABL
V.DRIVE
H.BLK
TXCONT
HALFTONE
TO I001
TO U002(PIP)
TERMINAL P.W.B
VM P.W.B
PSI1
18PB-B
12V(CPT)
12V(H.VCC)
SCL1
SDA1
GND
VMUTE
NOISE
BLK
CONTRAST
9V
GND
RTX
GTX
BTX
NOTCH
GND(H)
GND(H)
GND(H)
D043
D044
Q3A2
2SC458
(B/C)
Q3A3
2SC458
(B/C)
R3C5
12K
R3C6
10K
R3C7
47K
R3C8
47K
PTV
(A.B.C)
K715
CTV (D.E)
L5A7
100uH
C5E7
100/16
CE-M
Q5A3
2SC458
(B/C)
Q5A4
DTC124ES
Q5A5
2SC458
(B/C)
Q5A6
2SC458
(B/C)
D5A5
1SS254
D5A6
1SS254
K716
CTV(D.E)
EH2P
CTV
(D.E)
R3C3 1K
K729
C3A2
0.1
MYL-K
C3A3
0.01
MYL-K
R3C4
1K (PTV)
15K (CTV)
K158
PTV (A.B.C)
PSD1
5P-JP
IR-IN
BUSY
OSD-R2
OSD-G2
OSD-B2
PTV
(A.B.C)
PSD2
5P-JP
GND
DATA
CLOCK
LOAD1
GND
PTV
(C)
Q3A1
2SC458
(B/C)
L3A1
C3A1
R3A1
1K
R3A2
220
R3A3
K279
PSD3
CTV 10P-JP (D.E)
PTV 8P-JP (A.B.C)
H.DRIVE
GND(H)
H.BLK
ABL
HV.PRO
V.DRIVE
GND
V.BLK
BLK
D3A1
RD36EB3
PSD4
10P-JP
SC1(XRAY)
SC2 (+B)
SC3 (+26V)
SC4 (+11V)(+7V)
GND
A+12V (STAND BY)
TV ON/OFF
AC
GND
7V
PSD5
12P-JP
11V(9V)
11V(9V)
GND
26V(VM)
GND
33V(VT)
12V(CPT)
12V(H.VCC)
GND (AUDIO)
GND (AUDIO)
SVCC (AUDIO+26V)
SVCC (AUDIO+26V)
K360
CTV(D.E)

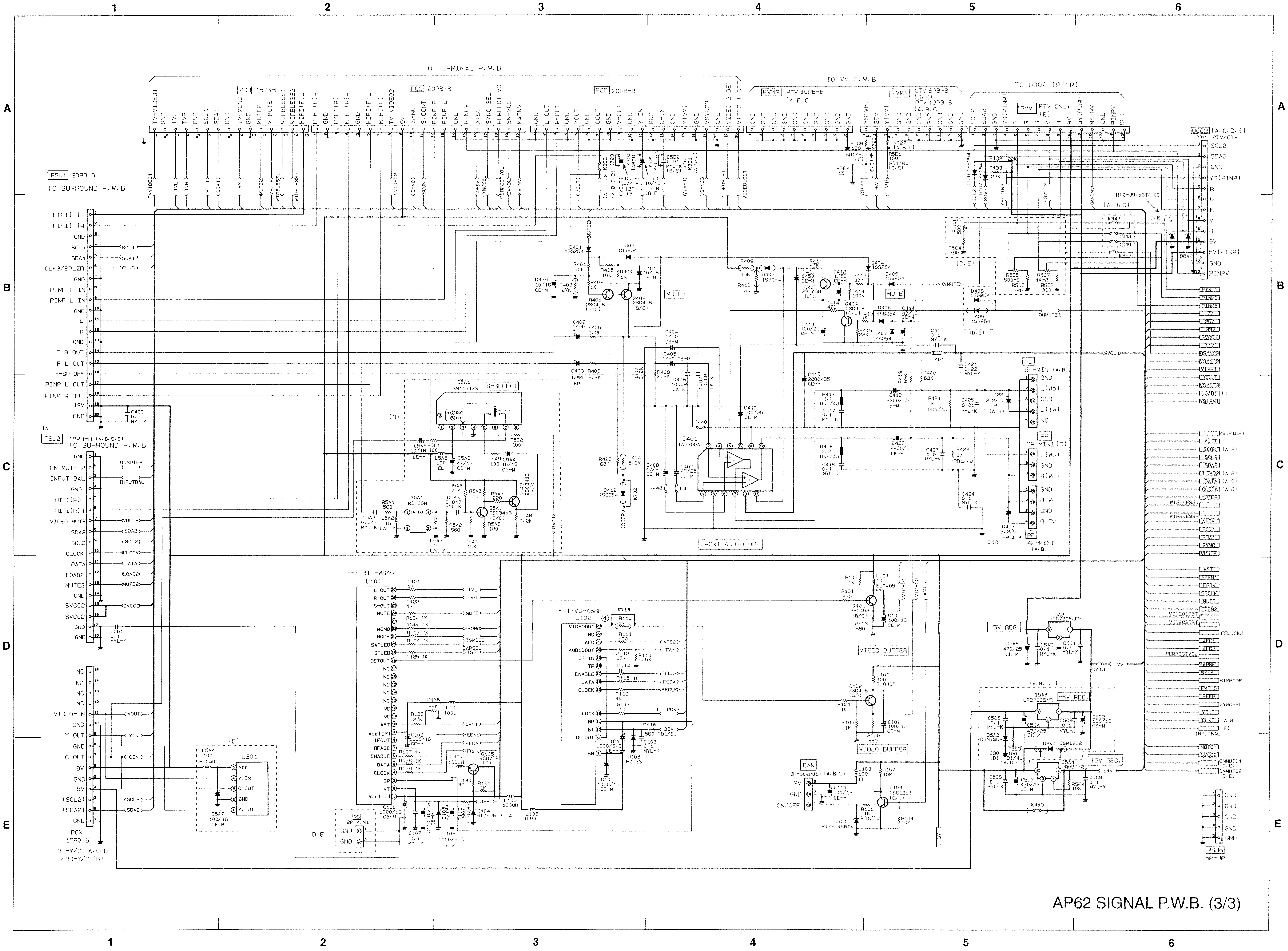
AP62 SIGNAL P.W.B. (2/3)

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

Circuit No.	Pin No.	Voltage VDC
Q3A2	B	0.7
	C	0
	E	0
Q3A3	B	0
	C	0.7
	E	0
Q5A3	B	3.8
	C	9.1
	E	3.1
Q5A4	B	4.8
	C	0
	E	0
Q5A5	B	3.9
	C	9.1
	E	3.3
Q5A6	B	0
	C	9.1
	E	0.1

BASIC CIRCUIT DIAGRAM

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.


1
2
3
4
5
6
A
B
C
D
E
TO TERMINAL P.W.B
PCB 15PB-B
PCC 20PB-B
PCD 20PB-B
TO VM P.W.B
PVM2 PTV 10PB-B (A.B.C)
PVM1 CTV 6PB-B (D.E) PTV 10PB-B (A.B.C)
TO U002 (PINP)
PMV PTV ONLY (B)
U002 (A.C.D.E) PTV/CTV
PSU1 20PB-B TO SURROUND P.W.B
HIFI(F)L
HIFI(F)R
GND
SCL1
SDA1
CLK3/SPLZR
PINP R IN
PINP L IN
L
R
F R OUT
F L OUT
F-SP OFF
PINP L OUT
PINP R OUT
+9V
PSU2 18PB-B (A.B.D.E) TO SURROUND P.W.B
ON MUTE 2
INPUT BAL
HIFI(A)L
HIFI(A)R
VIDEO MUTE
SDA2
SCL2
CLOCK
DATA
LOAD2
MUTE2
SVCC2
NC
VIDEO-IN
Y-OUT
C-OUT
9V
5V
(SCL2)
(SDA2)
PCX 15PB-S
3L-Y/C (A.C.D) or 3D-Y/C (B)
U301
L5A4 100 EL0405
C5A7 100/16 CE-M
I5A1 MM1111XS
S-SELECT
X5A1 MS-60N
Q5A1 2SC3413 (B/C)
Q5A2 2SC3413 (B/C)
MUTE
Q401 2SC458 (B/C)
Q402 2SC458 (B/C)
Q403 2SC458 (B/C)
Q404 2SC458 (B/C)
I401 TA8200AH
FRONT AUDIO OUT
PL 5P-MINI (A.B)
PP 3P-MINI (C)
PR 4P-MINI (A.B)
L(Wo)
R(Wo)
L(Tw)
R(Tw)
F-E BTF-WB451
U101
L-OUT
R-OUT
S-OUT
MUTE
MONO
MODE
SAPLED
STLED
DETOUT
AFT
Vcc(IF)
IFOUT
RFAGC
ENABLE
DATA
CLOCK
BP
VT
Vcc(Tu)
FRT-VG-A68FT
U102
VIDEOOUT
AFC
AUDIOOUT
IF-IN
TP
LOCK
BT
IF-OUT
BM
Q105 2SD789 (B)
D104 MTZ-J6.2CTA
D103 HZT33
PG 2P-MINI
Q101 2SC458 (B/C)
Q102 2SC458 (B/C)
VIDEO BUFFER
EAN 3P-Boardin (A.B.C)
ON/OFF
Q103 2SC1213 (C/D)
D101 MTZ-J15BTA
+5V REG.
I5A2 uPC7805AFH
I5A3 uPC7805AFH
+9V REG.
I5A4 PQ09RF21
PSD6 5P-JP
④

AP62 SIGNAL P.W.B. (3/3)

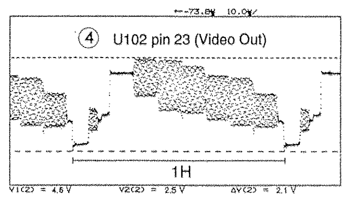
Circuit No.	Pin No.	Voltage VDC
I401	1	1.6
	2	0
	3	0
	4	0
	5	1.6
	6	9.1
	7	12.7
	8	5.0
	9	27.1
	10	0
	11	4.2
	12	12.4

Circuit No.	Pin No.	Voltage VDC
I5A2	1	8.3
	2	0
	3	5.0

Circuit No.	Pin No.	Voltage VDC
I5A3	1	8.3
	2	0.3
	3	5.2

Circuit No.	Pin No.	Voltage VDC
I5A4	1	11.1
	2	9.1
	3	0
	4	11.1

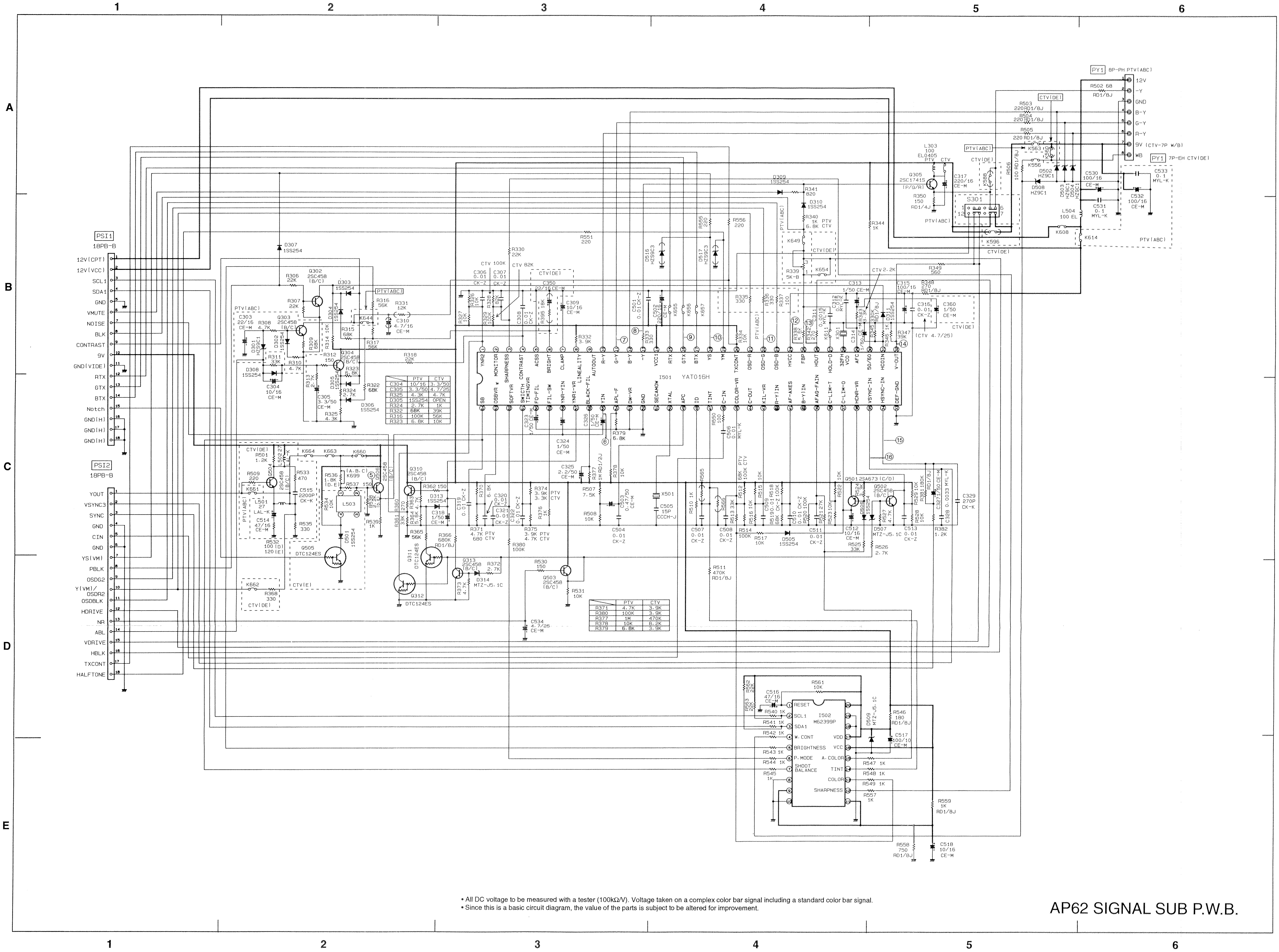
Circuit No.	Pin No.	Voltage VDC
Q101	B	6.6
	C	8.9
	E	5.9
Q102	B	1.6
	C	8.9
	E	1.0
Q103	B	0.6
	C	0
	E	0
Q105	B	6.3
	C	8.8
	E	5.7
Q401	B	0
	C	9.1
	E	0
Q402	B	0.7
	C	0
	E	0
Q403	B	0
	C	4.2
	E	0
Q404	B	0
	C	9.1
	E	0



- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

BASIC CIRCUIT DIAGRAM

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.


1
2
3
4
5
6
A
B
C
D
E
PSI1
18PB-B
12V(CPT)
12V(VCC)
SCL1
SDA1
GND
VMUTE
NOISE
BLK
CONTRAST
9V
GND(VIDE)
RTX
GTX
BTX
Notch
GND(H)
GND(H)
GND(H)
PSI2
18PB-B
YOUT
VSYNC3
SYNC
GND
CIN
GND
YS(VM)
PBLK
OSDG2
Y(VM)/OSDR2
OSDBLK
HDRIVE
NR
ABL
VDRIVE
HBLK
TXCONT
HALFTONE
I501
YAT016H
I502
M62399P
RESET
SCL1
SDA1
W.CONT
BRIGHTNESS
P.MODE
SHOOT BALANCE
VDD
VCC
A.COLOR
TINT
COLOR
SHARPNESS
PY1
8P-PH PTV(ABC)
12V
-Y
GND
B-Y
G-Y
R-Y
9V (CTV-7P W/B)
WB
PY1
7P-EH CTV(DE)
S301
Q302
2SC458
Q303
2SC458
Q304
2SC458
Q305
2SC1741S
Q310
2SC458
Q311
DTC124ES
Q312
DTC124ES
Q313
2SC458
Q501
2SA673
Q502
2SC458
Q503
2SC458
Q505
DTC124ES
L503
X501
PTV(ABC)
CTV(DE)
CTV(E)

	PTV	CTV
C304	10/16	3.3/50
C305	3.3/50	4.7/25
R325	4.3K	4.7K
D305	1SS254	OPEN
R324	2.7K	1K
R322	68K	39K
R316	100K	56K
R323	6.8K	10K

	PTV	CTV
R371	4.7K	3.9K
R380	100K	3.9K
R377	1M	470K
R376	10K	8.2K
R379	6.8K	3.9K

AP62 SIGNAL SUB P.W.B.

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

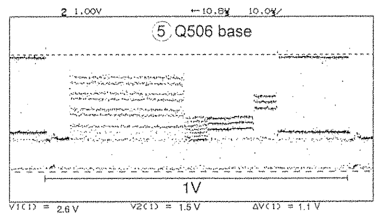
Circuit No.	Pin No.	Voltage VDC
I501	1	0
	2	0
	3	4.3
	4	7.0
	5	0
	6	4.8
	7	6.9
	8	8.9
	9	0.1
	10	5.1
	11	5.2
	12	5.3
	13	4.4
	14	9.0
	15	3.1
	16	3.1
	17	3.1
	18	0
	19	0
	20	4.9
	21	0
	22	0
	23	0
	24	7.8
	25	1.3
	26	0.8
	27	0
	28	5.0
	29	5.6
	30	8.7
	31	7.5
	32	4.4

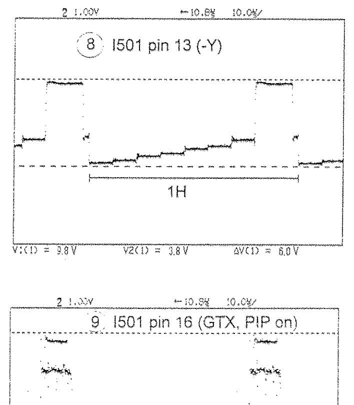
Circuit No.	Pin No.	Voltage VDC
I501	33	0
	34	7.0
	35	6.4
	36	0
	37	9.0
	38	4.0
	39	1.8
	40	1.3
	41	3.6
	42	1.3
	43	4.1
	44	6.5
	45	4.7
	46	3.1
	47	4.5
	48	0.7
	49	5.8
	50	5.5
	51	1.4
	52	0
	53	0
	54	3.6
	55	3.7
	56	6.0
	57	4.4
	58	3.8
	59	0
	60	4.2
	61	4.5
	62	6.0
	63	3.7
	64	5.7

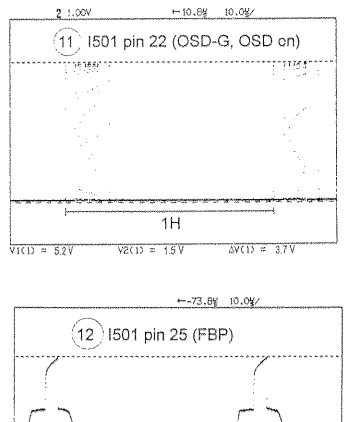
Circuit No.	Pin No.	Voltage VDC
I502	1	5.3
	2	5.2
	3	5.2
	4	0
	5	5.8
	6	8.8
	7	5.7
	8	0
	9	3.7
	10	0
	11	3.7
	12	4.4
	13	4.4
	14	4.5
	15	8.8
	16	9.0
	17	5.3
	18	0
	19	0
	20	5.3

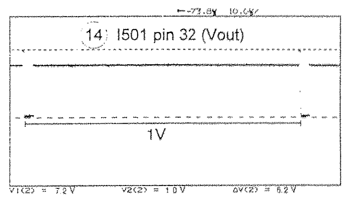
Circuit No.	Pin No.	Voltage VDC
Q302	B	0
	C	9.0
	E	0
Q303	B	0
	C	5.1
	E	0
Q304	B	7.9
	C	9.0
	E	7.2
Q305	B	4.5
	C	8.9
	E	3.9
Q310	B	4.4
	C	9.0
	E	3.8
Q311	B	8.1
	C	0
	E	0
Q312	B	8.1
	C	0
	E	0
Q313	B	0.7
	C	0
	E	0

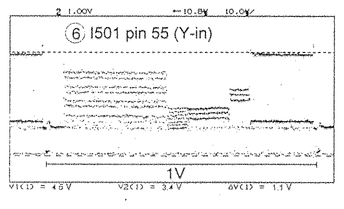
Circuit No.	Pin No.	Voltage VDC
Q501	B	8.4
	C	9.0
	E	9.0
Q502	B	0.7
	C	0
	E	0
Q503	B	8.8
	C	9.0
	E	8.1
Q506	B	2.2
	C	9.0
	E	1.5

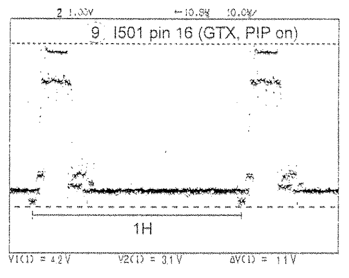

⑤ Q506 base

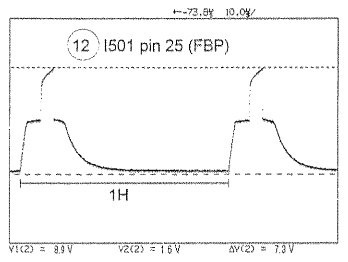

⑧ I501 pin 13 (-Y)

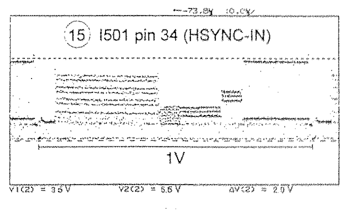

⑪ I501 pin 22 (OSD-G, OSD on)

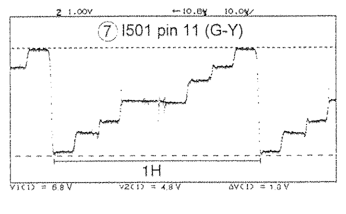

⑭ I501 pin 32 (Vout)

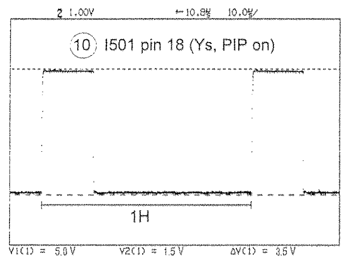

⑥ I501 pin 55 (Y-in)

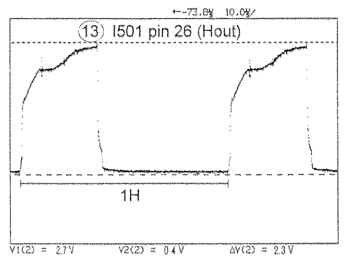

⑨ I501 pin 16 (GTX, PIP on)

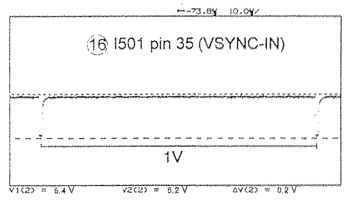

⑫ I501 pin 25 (FBP)


⑮ I501 pin 34 (HSYNC-IN)


⑦ I501 pin 11 (G-Y)

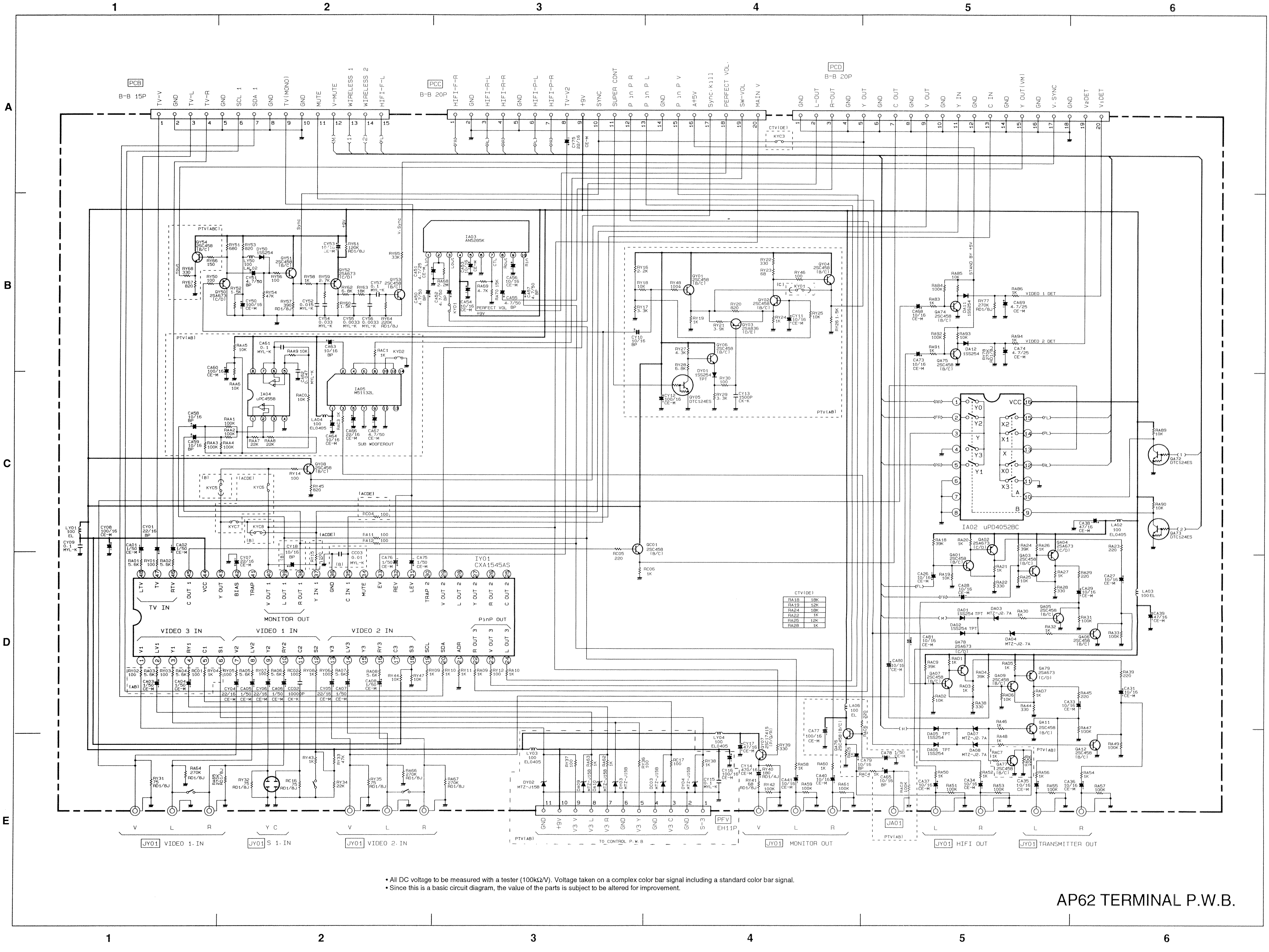

⑩ I501 pin 18 (Ys, PIP on)


⑬ I501 pin 26 (Hout)


⑯ I501 pin 35 (VSYNC-IN)

BASIC CIRCUIT DIAGRAM

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.


1
2
3
4
5
6
A
B
C
D
E
PCB
B-B 15P
PCC
B-B 20P
PCD
B-B 20P
IA03
AN5285K
IA04
uPC4558
IA05
M51132L
IA02 uPD4052BC
IY01
CXA1545AS
TV IN
MONITOR OUT
VIDEO 3 IN
VIDEO 1 IN
VIDEO 2 IN
PinP OUT
SUB WOOFEROUT
PTV(ABC)
PTV(AB)
PFV
EH11P
TO CONTROL P.W.B
JY01 VIDEO 1 IN
JY01 S 1 IN
JY01 VIDEO 2 IN
JY01 MONITOR OUT
JA01
JY01 HIFI OUT
JY01 TRANSMITTER OUT
VIDEO 1 DET
VIDEO 2 DET

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

AP62 TERMINAL P.W.B.

Circuit No.	Pin No.	Voltage VDC
IA02	1	4.1
	2	4.1
	3	4.1
	4	0
	5	4.1
	6	0
	7	0
	8	0
	9	9.0
	10	0
	11	0
	12	4.1
	13	4.1
	14	4.1
	15	4.1
	16	9.0

Circuit No.	Pin No.	Voltage VDC
IA03	1	4.5
	2	4.0
	3	4.5
	4	9.0
	5	4.5
	6	0
	7	0
	8	4.5
	9	1.9
	10	4.5

Circuit No.	Pin No.	Voltage VDC
IY01	1	4.6
	2	4.6
	3	4.6
	4	4.6
	5	4.6
	6	0.2
	7	4.6
	8	4.6
	9	4.6
	10	4.6
	11	4.6
	12	2.5
	13	4.6
	14	4.6
	15	4.6
	16	4.6
	17	4.6
	18	4.3
	19	5.0
	20	5.0
	21	0
	22	4.7
	23	4.5
	24	4.7

Circuit No.	Pin No.	Voltage VDC
IY01	25	4.5
	26	4.7
	27	4.5
	28	4.7
	29	4.5
	30	4.5
	31	4.6
	32	4.6
	33	4.6
	34	0
	35	4.6
	36	0
	37	4.6
	38	4.7
	39	4.7
	40	4.5
	41	4.5
	42	4.7
	43	4.5
	44	8.9
	45	4.5
	46	4.6
	47	4.6
	48	4.6

Circuit No.	Pin No.	Voltage VDC
QA01	B	1.8
	C	8.3
	E	1.2
QA02	B	8.3
	C	4.1
	E	9.0
QA03	B	1.8
	C	8.3
	E	1.2
QA04	B	8.3
	C	4.2
	E	9.0
QA05	B	0
	C	0
	E	0
QA06	B	0
	C	0
	E	0
QA07	B	1.8
	C	8.3
	E	1.2
QA09	B	1.8
	C	8.3
	E	1.2
QA11	B	0
	C	0
	E	0
QA12	B	0
	C	0
	E	0

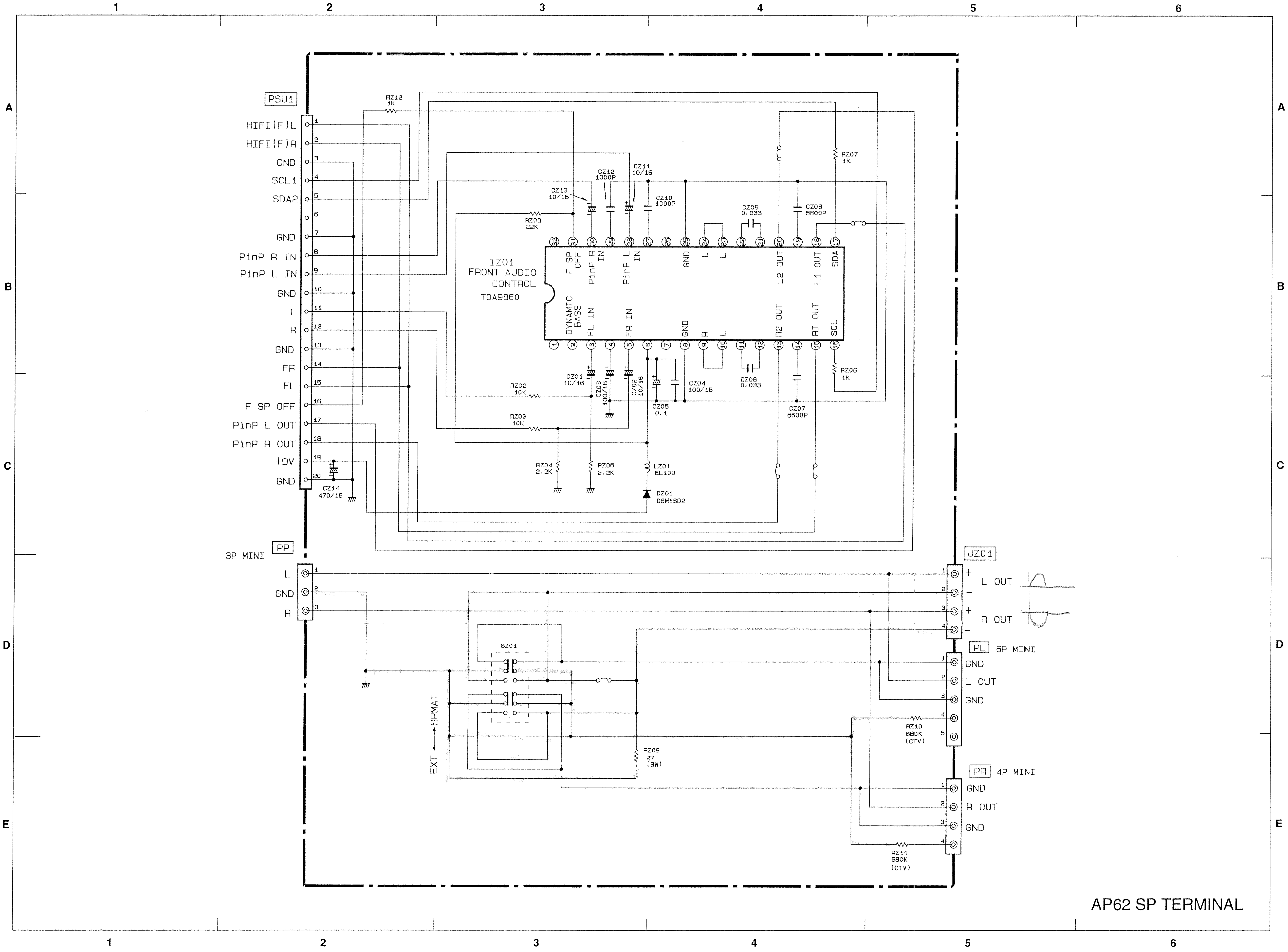
Circuit No.	Pin No.	Voltage VDC
QA72	B	4.9
	C	0
	E	0
QA73	B	0.1
	C	9.0
	E	0
QA74	B	0.6
	C	0
	E	0
QA75	B	0.6
	C	0.1
	E	0
QA78	B	8.3
	C	4.1
	E	9.0
QA79	B	8.3
	C	4.2
	E	9.0

Circuit No.	Pin No.	Voltage VDC
QC01	B	4.5
	C	9.0
	E	3.8
QY01	B	5.2
	C	9.0
	E	4.5
QY07	B	4.4
	C	8.9
	E	3.8
QY08	B	4.5
	C	9.0
	E	3.8

Circuit No.	Pin No.	Voltage VDC
QY50	B	4.5
	C	0
	E	5.1
QY51	B	6.0
	C	9.0
	E	5.3
QY52	B	5.3
	C	0.1
	E	5.2
QY53	B	-0.2
	C	6.3
	E	0
QY54	B	5.1
	C	9.0
	E	4.4

BASIC CIRCUIT DIAGRAM

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.


1
2
3
4
5
6
A
B
C
D
E
PSU1
HIFI(F)L
HIFI(F)R
GND
SCL1
SDA2
GND
PinP R IN
PinP L IN
GND
L
R
GND
FR
FL
F SP OFF
PinP L OUT
PinP R OUT
+9V
GND
CZ14
470/16
RZ12
1K
CZ13
10/16
CZ12
1000P
CZ11
10/16
CZ10
1000P
RZ08
22K
CZ09
0.033
CZ08
5600P
RZ07
1K
IZ01
FRONT AUDIO
CONTROL
TDA9860
F SP OFF
PinP R IN
PinP L IN
GND
L
L
L2 OUT
L1 OUT
SDA
DYNAMIC BASS
FL IN
FR IN
GND
R
L
R2 OUT
R1 OUT
SCL
CZ01
10/16
CZ03
100/16
CZ02
10/16
CZ04
100/16
CZ05
0.1
CZ06
0.033
CZ07
5600P
RZ06
1K
RZ02
10K
RZ03
10K
RZ04
2.2K
RZ05
2.2K
LZ01
EL100
DZ01
DSM1SD2
3P MINI
PP
L
GND
R
SZ01
SPMAT
EXT
RZ09
27
(3W)
JZ01
L OUT
R OUT
PL
5P MINI
GND
L OUT
GND
RZ10
680K
(CTV)
PR
4P MINI
GND
R OUT
GND
RZ11
680K
(CTV)
AP62 SP TERMINAL

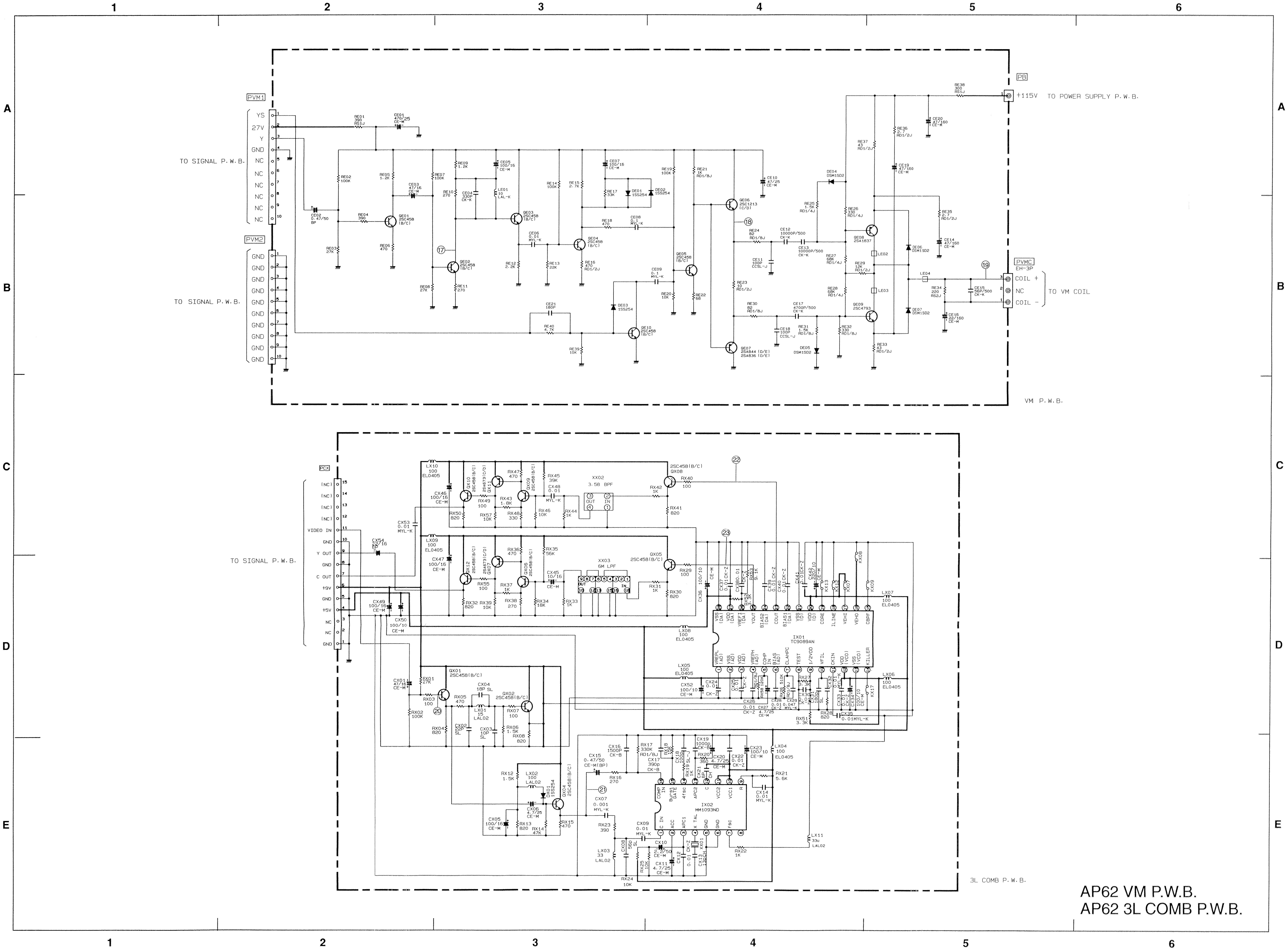
- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

Circuit No.	Pin No.	Voltage VDC
IZ01	1	4.1
	2	0
	3	4.1
	4	8.0
	5	4.3
	6	8.2
	7	4.1
	8	0
	9	4.1
	10	4.1
	11	4.1
	12	4.1
	13	4.1
	14	4.1
	15	4.1
	16	5.1

Circuit No.	Pin No.	Voltage VDC
IZ01	17	5.0
	18	4.1
	19	4.1
	20	4.1
	21	4.1
	22	4.1
	23	4.1
	24	4.1
	25	0
	26	4.1
	27	4.1
	28	4.1
	29	4.1
	30	4.1
	31	0.2
	32	4.1

BASIC CIRCUIT DIAGRAM

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.


1
2
3
4
5
6
A
B
C
D
E
PVM1
YS
27V
Y
GND
NC
TO SIGNAL P.W.B.
PVM2
GND
PB
+115V TO POWER SUPPLY P.W.B.
PVMC
EH-3P
COIL +
NC
COIL −
TO VM COIL
VM P.W.B.
PCX
(NC)
VIDEO IN
Y OUT
C OUT
+9V
+5V
XX02 3.58 BPF
XX03 GM LPF
IX01 TC90894N
IX02 MM1093ND
3L COMB P.W.B.

AP62 VM P.W.B.
AP62 3L COMB P.W.B.

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

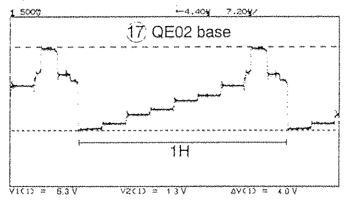
Circuit No.	Pin No.	Voltage VDC
IX01	1	1.5
	2	0
	3	5.2
	4	3.6
	5	2.3
	6	1.5
	7	3.5
	8	0
	9	2.6
	10	2.0
	11	2.2
	12	5.2
	13	0
	14	0
	15	0
	16	0
	17	5.1
	18	0
	19	0
	20	5.1
	21	0
	22	3.7
	23	4.4
	24	1.9
	25	4.2
	26	3.8
	27	5.1
	28	0

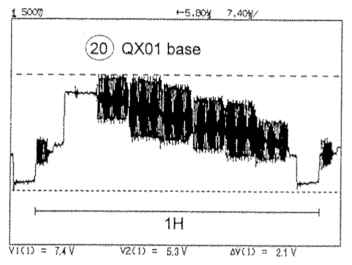
Circuit No.	Pin No.	Voltage VDC
IX02	1	3.6
	2	0.9
	3	2.5
	4	3.5
	5	0
	6	0
	7	2.4
	8	0
	9	3.6
	10	5.1
	11	5.1
	12	3.4
	13	2.2
	14	3.2
	15	0.8
	16	2.8

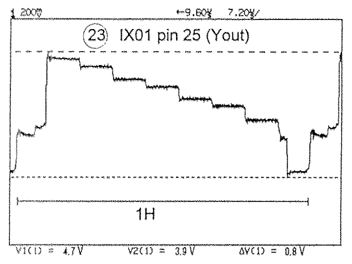
Circuit No.	Pin No.	Voltage VDC
QX01	B	6.1
	C	9.0
	E	5.4
QX02	B	4.1
	C	9.0
	E	3.4
QX04	B	3.5
	C	9.0
	E	2.8
QX05	B	4.3
	C	8.9
	E	3.6
QX06	B	2.1
	C	8.3
	E	1.4
QX07	B	8.3
	C	5.3
	E	8.9

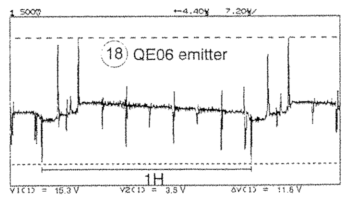
Circuit No.	Pin No.	Voltage VDC
QX08	B	4.4
	C	8.9
	E	3.8
QX09	B	1.8
	C	8.3
	E	1.1
QX10	B	5.0
	C	9.0
	E	4.3
QX11	B	8.3
	C	5.0
	E	8.9
QX12	B	5.3
	C	8.9
	E	4.6

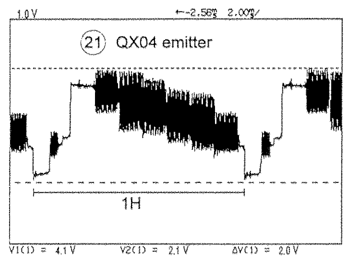
Circuit No.	Pin No.	Voltage VDC
QE01	B	2.8
	C	10.1
	E	2.1
QE02	B	2.6
	C	7.1
	E	1.9
QE03	B	7.1
	C	15.5
	E	6.4
QE04	B	2.6
	C	4.9
	E	1.9
QE05	B	1.1
	C	9.1
	E	0.4
QE06	B	9.1
	C	15.5
	E	9.1
QE07	B	9.1
	C	0
	E	9.1
QE08	B	112.4
	C	50.2
	E	112.5
QE09	B	0.2
	C	49.8
	E	0.2
QE10	B	0
	C	0.1
	E	0

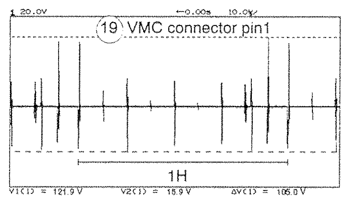


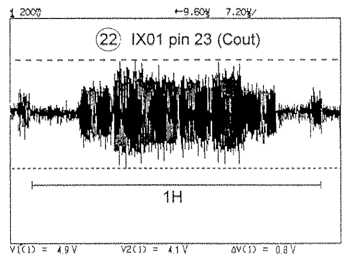






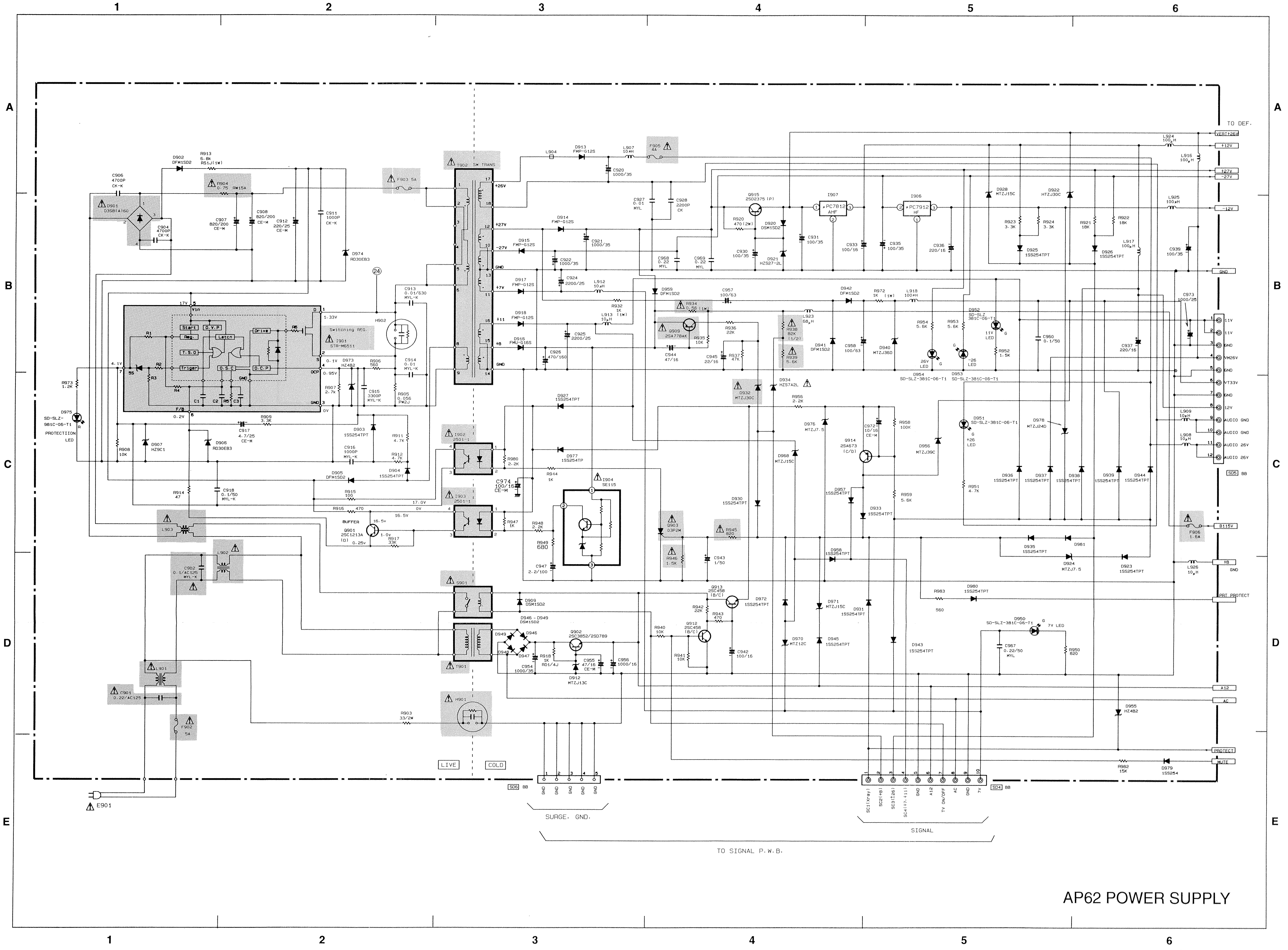






BASIC CIRCUIT DIAGRAM

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.


1
2
3
4
5
6
A
B
C
D
E
TO DEF.
VERT+26V
+12V
+27V
-27V
-12V
GND
T902 SW TRANS
F903 5A
F905 4A
I901 STR-M6511
Switching REG.
Start
O.V.P
Latch
Drive
Reg.
T.S.D
Trigger
O.S.C
O.C.P
I907 PC7812 AHF
I906 PC7912 HF
Q915 2SD2375 (P)
Q905 2SA778AK
Q914 2SA673 (C/D)
Q913 2SC458 (B/C)
Q912 2SC458 (B/C)
Q902 2SC3852/2SD789
Q901 2SC1213A (D)
BUFFER
I902 2501-1
I903 2501-1
I904 SE115
S901
T901
H901
L901
L902
L903
D901 D3SB1A160
F902 5A
C901 0.22/AC125
E901
F906 1.6A
B115V
H8
GND
CRT PROTECT
A12
AC
PROTECT
MUTE
LIVE
COLD
SURGE. GND.
SIGNAL
TO SIGNAL P.W.B.
11V
GND
VM26V
VT33V
12V
AUDIO GND
AUDIO 26V
SD5 B8
SD6 B8
SD4 B8
PROTECTION LED
26V LED
-26 LED
11V LED
+26 LED
7V LED
24

AP62 POWER SUPPLY

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

Circuit No.	Pin No.	Voltage VDC
I901	1	162.2
	2	0.1
	3	0
	4	1.4
	5	18.9
	6	0.2
	7	3.3

Circuit No.	Pin No.	Voltage VDC
I902	1	12.1
	2	12.1
	3	3.3
	4	18.9

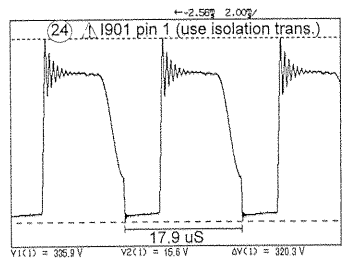
Circuit No.	Pin No.	Voltage VDC
I903	1	12.1
	2	11.2
	3	1.0
	4	18.5

Circuit No.	Pin No.	Voltage VDC
I904	1	114.9
	2	9.1
	3	0

Circuit No.	Pin No.	Voltage VDC
I906	1	0
	2	-26.7
	3	-12.2

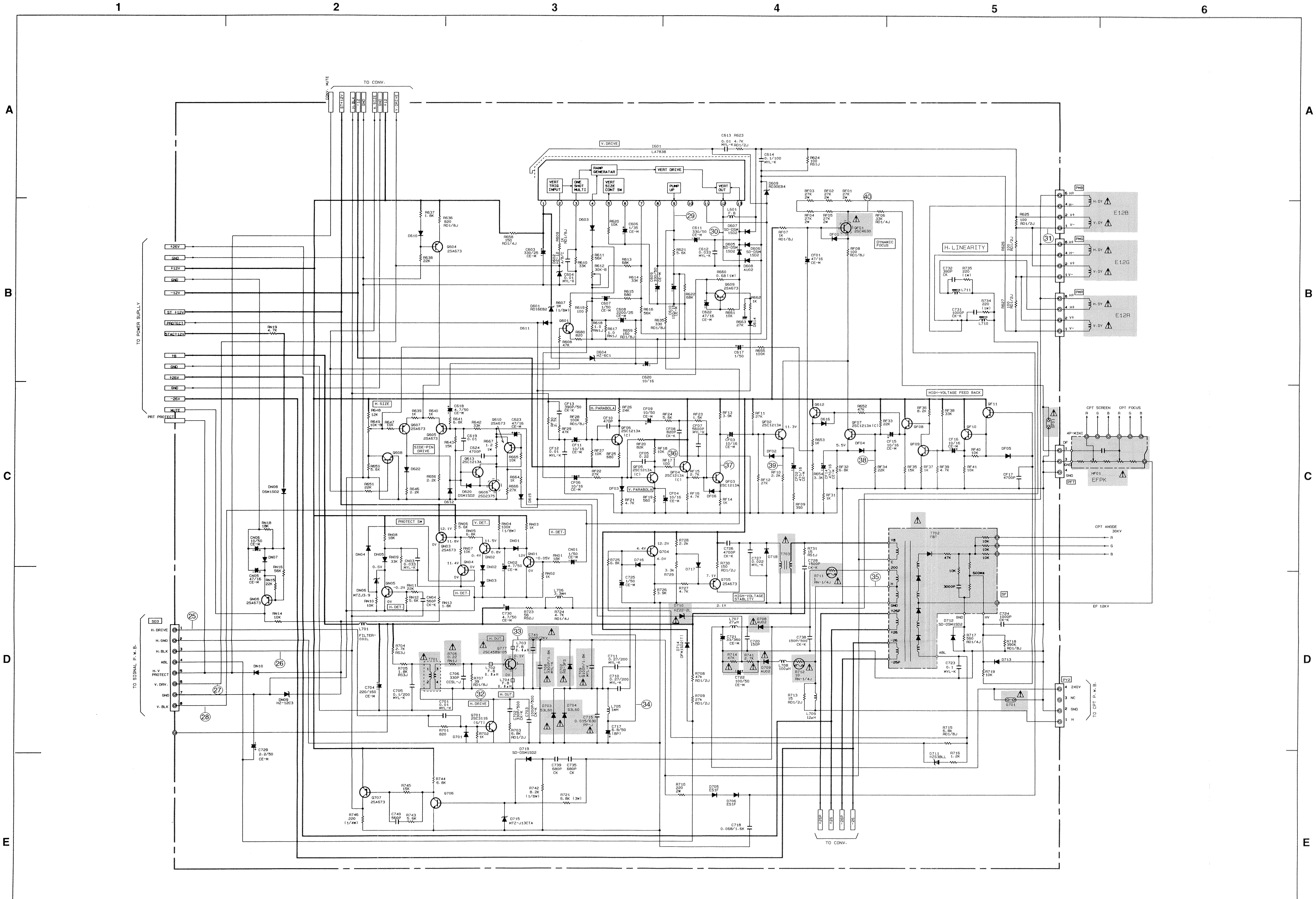
Circuit No.	Pin No.	Voltage VDC
I907	1	25.6
	2	0
	3	11.9

Circuit No.	Pin No.	Voltage VDC
Q901	B	1.0
	C	18.5
	E	0.2
Q902	B	13.0
	C	18.5
	E	12.5
Q903	K	0
	A	12.1
	G	0.1
Q909	B	114.4
	C	0.2
	E	114.9
Q912	B	0.1
	C	12.3
	E	0
Q913	B	12.3
	C	12.5
	E	11.7
Q914	B	6.7
	C	0.3
	E	7.1
Q915	B	26.2
	C	27.1
	E	25.6



BASIC CIRCUIT DIAGRAM

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.


1
2
3
4
5
6
A
B
C
D
E
TO CONV.
TO POWER SUPPLY
TO SIGNAL P.W.B.
TO CPT P.W.B.
I601 LA7838
VERT TRIG INPUT
ONE SHOT MULTI
RAMP GENERATOR
VERT SIZE CONT SW
VERT DRIVE
PUMP UP
VERT OUT
V. DRIVE
H. SIZE
H. PARABOLA
V. PARABOLA
SIDE-PIN DRIVE
PROTECT SW
V. DET.
H. DET.
H. DRIVE
H. OUT
H. LINEARITY
DYNAMIC FOCUS
HIGH-VOLTAGE FEED BACK
HIGH-VOLTAGE STABILITY
E12B
E12G
E12R
H.DY
V.DY
EFPK
CPT SCREEN
CPT FOCUS
CPT ANODE 30KV
T702 FBT
EF 12KV
SD3
PRT PROTECT
MUTE

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

AP62 CHASSIS DEFLECTION

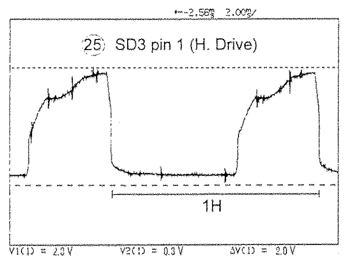
Circuit No.	Pin No.	Voltage VDC
I601	1	11.1
	2	4.4
	3	5.5
	4	5.6
	5	0
	6	5.1
	7	5.6
	8	25.3
	9	1.6
	10	1.4
	11	0
	12	13.0
	13	25.1

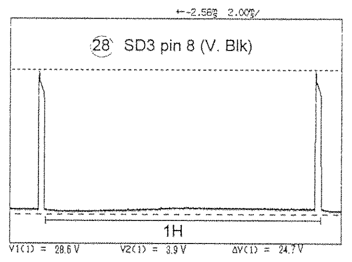
Circuit No.	Pin No.	Voltage VDC
Q601	B	0
	C	4.7
	E	0
Q604	B	10.4
	C	4.2
	E	11.0
Q605	B	2.9
	C	1.7
	E	3.5
Q606	B	0.5
	C	15.6
	E	0
Q607	B	3.4
	C	1.1
	E	3.9
Q608	B	0
	C	2.4
	E	0
Q609	B	25.6
	C	0
	E	25.9
Q610	B	15.6
	C	0
	E	15.8
Q612	B	4.3
	C	11.8
	E	3.7
Q613	B	0.9
	C	15.6
	E	0.5

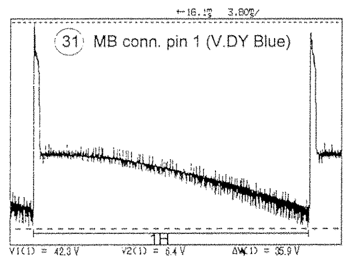
Circuit No.	Pin No.	Voltage VDC
Q701	B	0.2
	C	37.3
	E	0
Q704	B	3.8
	C	11.8
	E	3.3
Q705	B	6.0
	C	2.3
	E	6.7
Q706	B	-0.5
	C	9.6
	E	0
Q707	B	12.8
	C	2.3
	E	11.8
Q777	B	-0.1
	C	112.9
	E	0

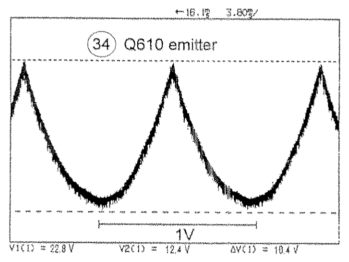
Circuit No.	Pin No.	Voltage VDC
QF01	B	11.8
	C	598.0
	E	11.3
QF02	B	6.0
	C	11.0
	E	5.8
QF03	B	2.7
	C	4.3
	E	2.1
QF04	B	3.4
	C	11.8
	E	2.9
QF05	B	1.1
	C	3.4
	E	0.5
QF06	B	-11.2
	C	-5.2
	E	-11.6
QF07	B	5.8
	C	11.0
	E	5.3
QF08	B	5.1
	C	11.8
	E	4.5
QF09	B	1.5
	C	5.1
	E	0.9
QF10	B	10.2
	C	11.8
	E	9.5
QF11	B	10.5
	C	11.8
	E	10.2

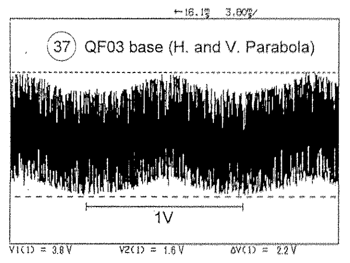
Circuit No.	Pin No.	Voltage VDC
QN01	B	0
	C	11.6
	E	0
QN02	B	0.9
	C	12.5
	E	0.5
QN03	B	12.5
	C	0
	E	12.5
QN04	B	0
	C	12.5
	E	0
QN05	B	-0.2
	C	0.6
	E	0
QN06	B	10.3
	C	0
	E	10.3

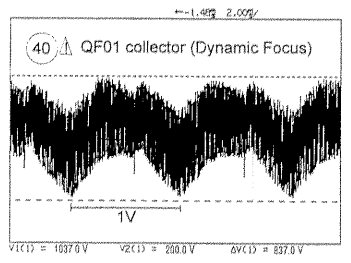

㉕ SD3 pin 1 (H. Drive)

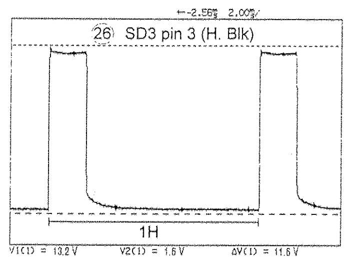

㉘ SD3 pin 8 (V. Blk)

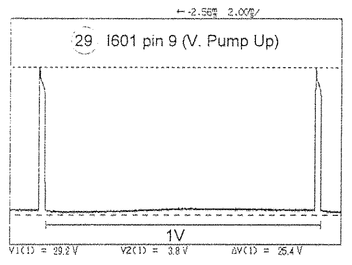

㉛ MB conn. pin 1 (V.DY Blue)

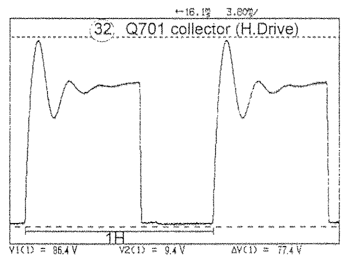

㉞ Q610 emitter

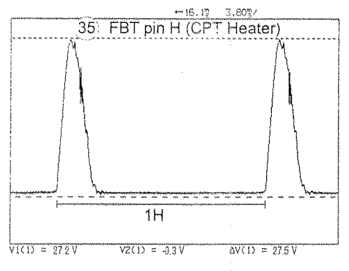

㊲ QF03 base (H. and V. Parabola)

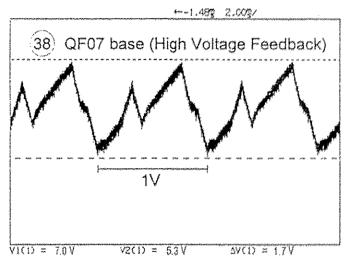

㊵ ⚠ QF01 collector (Dynamic Focus)

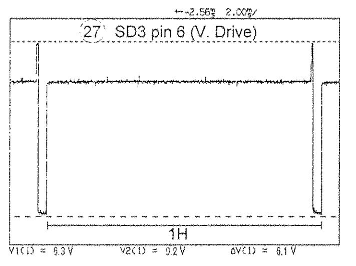

㉖ SD3 pin 3 (H. Blk)

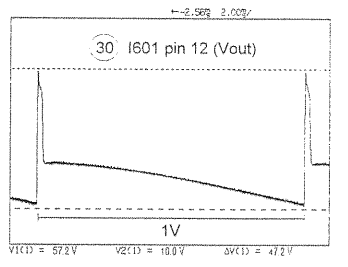

㉙ I601 pin 9 (V. Pump Up)

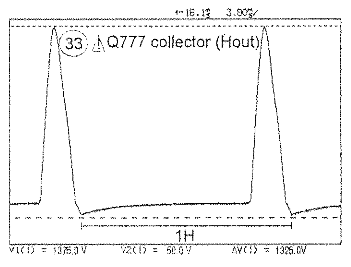

㉜ Q701 collector (H.Drive)

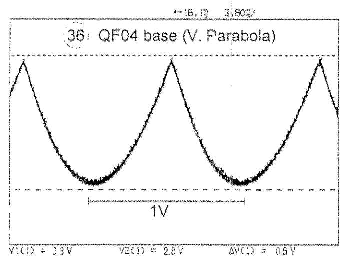

㉟ FBT pin H (CPT Heater)

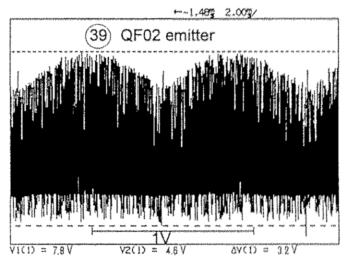

㊳ QF07 base (High Voltage Feedback)


㉗ SD3 pin 6 (V. Drive)


㉚ I601 pin 12 (Vout)

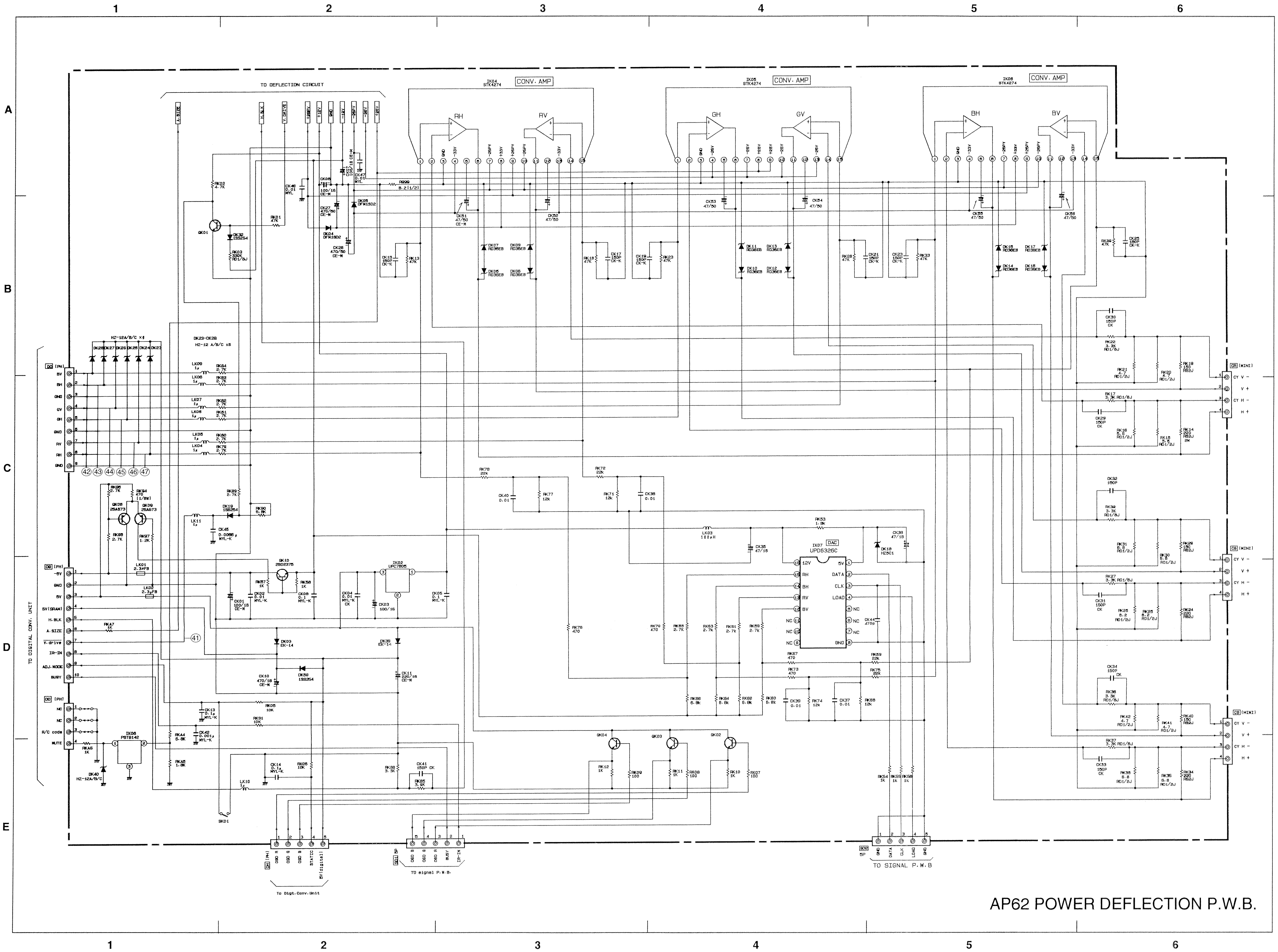

㉝ Q777 collector (Hout)


㊱ QF04 base (V. Parabola)


㊴ QF02 emitter

BASIC CIRCUIT DIAGRAM

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.


1
2
3
4
5
6
A
B
C
D
E
TO DEFLECTION CIRCUIT
IK04 STK4274 CONV. AMP
IK05 STK4274 CONV. AMP
IK06 STK4274 CONV. AMP
RH
RV
GH
GV
BH
BV
IK07 UPD6326C DAC
IK02 UPC7805
IK08 PST9142
TO DIGITAL CONV. UNIT
To Digt.Conv.Unit
TO signal P.W.B.
TO SIGNAL P.W.B
CY V −
V +
CY H −
H +

AP62 POWER DEFLECTION P.W.B.

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

Circuit No.	Pin No.	Voltage VDC
IK02	1	11.8
	2	0
	3	4.9

Circuit No.	Pin No.	Voltage VDC
IK04	1	0.2
	2	0.2
	3	0
	4	-32.9
	5	-22.2
	6	-0.3
	7	-26.5
	8	33.3
	9	27.0
	10	-26.5
	11	-0.4
	12	-22.5
	13	-32.9
	14	-0.3
	15	-0.3

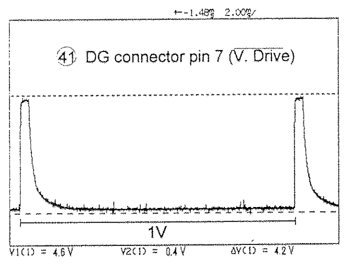
Circuit No.	Pin No.	Voltage VDC
IK05	1	0.3
	2	0.3
	3	0
	4	-26.5
	5	-17.8
	6	0.4
	7	-26.5
	8	27.0
	9	27.0
	10	-26.5
	11	-0.5
	12	-18.3
	13	-26.5
	14	-0.4
	15	-0.4

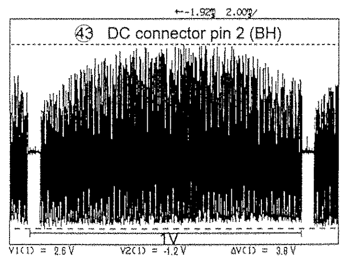
Circuit No.	Pin No.	Voltage VDC
IK06	1	-0.4
	2	-0.4
	3	0
	4	-32.9
	5	-22.5
	6	-0.4
	7	-26.5
	8	33.3
	9	27.0
	10	-26.5
	11	-0.4
	12	-22.5
	13	-32.9
	14	-0.3
	15	-0.3

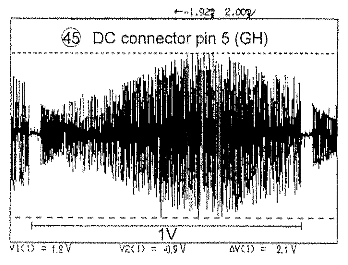
Circuit No.	Pin No.	Voltage VDC
IK08	1	3.4
	2	5.7
	3	0

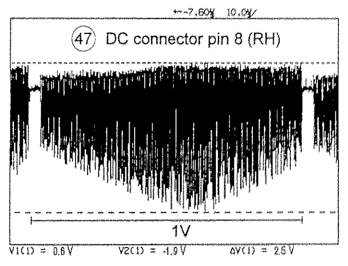
Circuit No.	Pin No.	Voltage VDC
IK07	1	5.0
	2	5.0
	3	5.0
	4	0
	5	0
	6	5.0
	7	0.5
	8	0
	9	4.5
	10	5.0
	11	5.0
	12	5.3
	13	5.3
	14	5.3
	15	5.1
	16	11.7

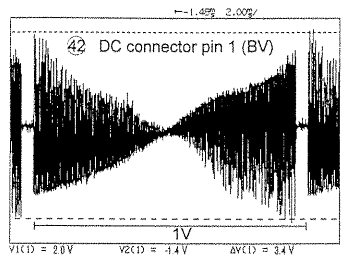
Circuit No.	Pin No.	Voltage VDC
QK01	B	0.6
	C	0.3
	E	0
QK02	B	0
	C	4.9
	E	0
QK03	B	0
	C	4.9
	E	0
QK04	B	0
	C	4.9
	E	0
QK08	B	-0.1
	C	0
	E	0.5
QK09	B	0
	C	-11.1
	E	0.5
QK10	B	-11.6
	C	-5.3
	E	-12.2

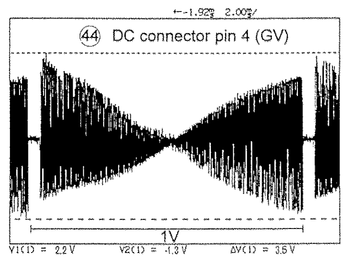

㊶ DC connector pin 7 (V. Drive)

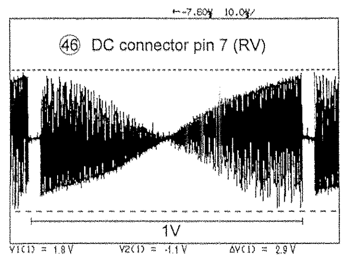

㊸ DC connector pin 2 (BH)


㊺ DC connector pin 5 (GH)


㊼ DC connector pin 8 (RH)

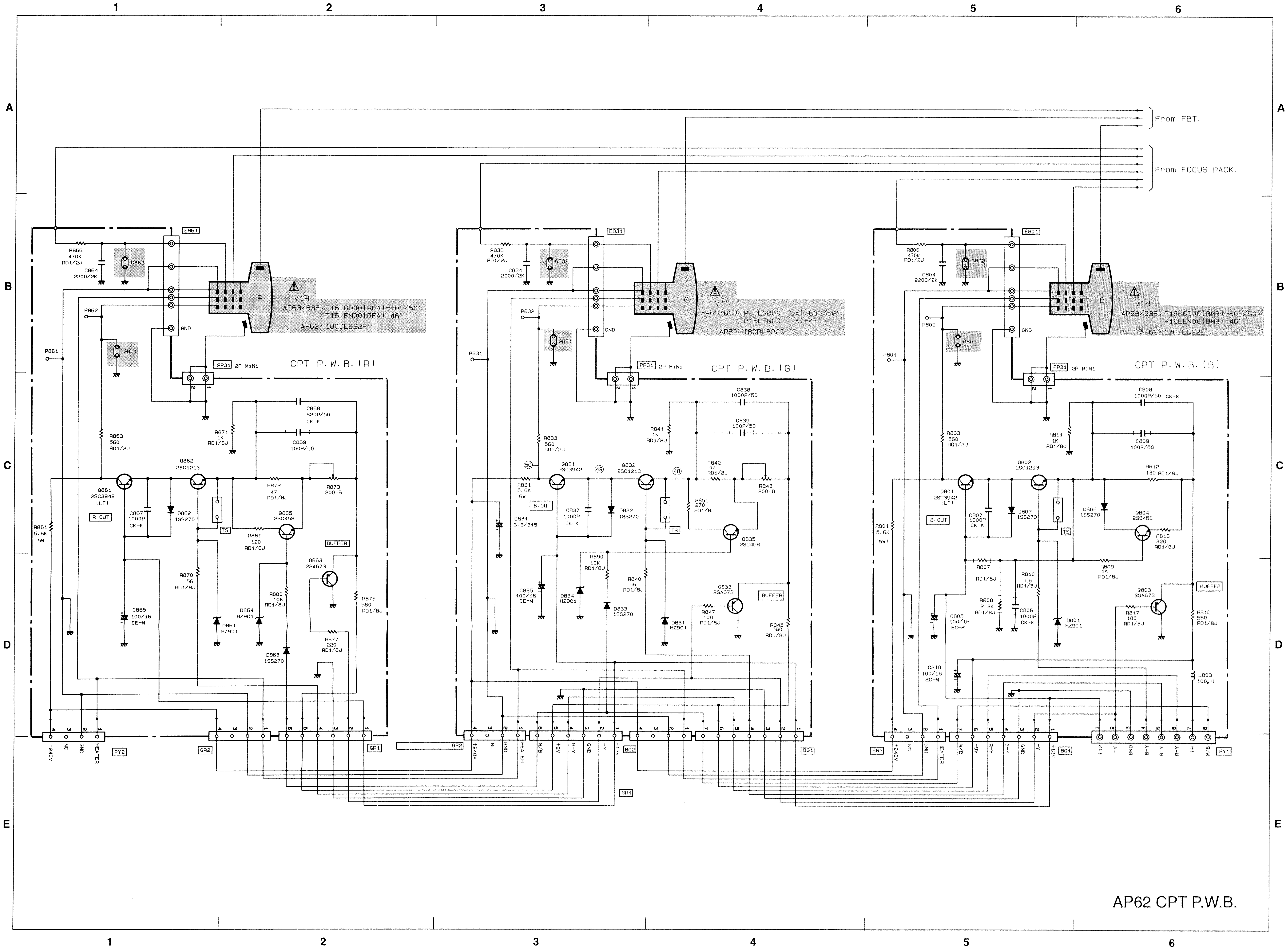

㊷ DC connector pin 1 (BV)


㊹ DC connector pin 4 (GV)


㊻ DC connector pin 7 (RV)

BASIC CIRCUIT DIAGRAM

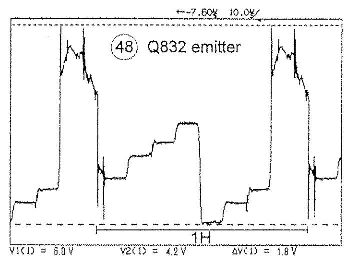
PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

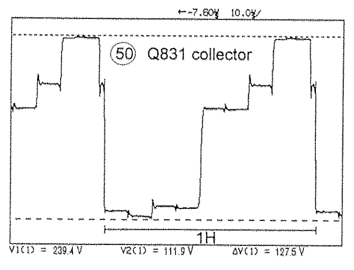

1
2
3
4
5
6
A
B
C
D
E
From FBT.
From FOCUS PACK.
E861
R866
470K
RD1/2J
C864
2200/2K
G862
P862
G861
P861
GND
⚠
V1R
AP63/63B: P16LGD00(RFA)-60"/50"
P16LEN00(RFA)-46"
AP62: 180DLB22R
R
PP31 2P MINI
CPT P.W.B.(R)
C868
820P/50
CK-K
R871
1K
RD1/8J
C869
100P/50
R863
560
RD1/2J
Q862
2SC1213
Q861
2SC3942
(LT)
R.OUT
C867
1000P
CK-K
D862
1SS270
TS
R872
47
RD1/8J
R873
200-B
Q865
2SC458
R881
120
RD1/8J
BUFFER
Q863
2SA673
R861
5.6K
5W
R870
56
RD1/8J
R880
10K
RD1/8J
R875
560
RD1/8J
C865
100/16
CE-M
D861
HZ9C1
D864
HZ9C1
R877
220
RD1/8J
D863
1SS270
+240V
NC
GND
HEATER
PY2
GR2
GR1
E831
R836
470K
RD1/2J
C834
2200/2K
G832
P832
G831
P831
⚠
V1G
AP63/63B: P16LGD00(HLA)-60"/50"
P16LEN00(HLA)-46"
AP62: 180DLB22G
G
PP31 2P MINI
CPT P.W.B.(G)
C838
1000P/50
C839
100P/50
R841
1K
RD1/8J
R833
560
RD1/2J
(50)
Q831
2SC3942
(49)
Q832
2SC1213
(48)
R842
47
RD1/8J
R843
200-B
R831
5.6K
5W
B.OUT
C831
3.3/315
C837
1000P
CK-K
D832
1SS270
R851
270
RD1/8J
Q835
2SC458
R850
10K
RD1/8J
R840
56
RD1/8J
C835
100/16
CE-M
D834
HZ9C1
D833
1SS270
D831
HZ9C1
Q833
2SA673
R847
100
RD1/8J
R845
560
RD1/8J
W/B
+9V
R-Y
-Y
+12V
BG2
BG1
E801
R806
470k
RD1/2J
C804
2200/2k
G802
P802
G801
P801
⚠
V1B
AP63/63B: P16LGD00(BMB)-60"/50"
P16LEN00(BMB)-46"
AP62: 180DLB22B
B
PP31 2P MINI
CPT P.W.B.(B)
C808
1000P/50 CK-K
R811
1K
RD1/8J
C809
100P/50
R803
560
RD1/2J
Q802
2SC1213
R812
130 RD1/8J
Q801
2SC3942
(LT)
R801
5.6K
(5W)
C807
1000P
CK-K
D802
1SS270
D805
1SS270
Q804
2SC458
R818
220
RD1/8J
R807
RD1/8J
R809
1K
RD1/8J
R810
56
RD1/8J
Q803
2SA673
R808
2.2K
RD1/8J
C806
1000P
CK-K
C805
100/16
EC-M
D801
HZ9C1
R817
100
RD1/8J
R815
560
RD1/8J
C810
100/16
EC-M
L803
100μH
G-Y
+12
B-Y
+9
PY1
AP62 CPT P.W.B.

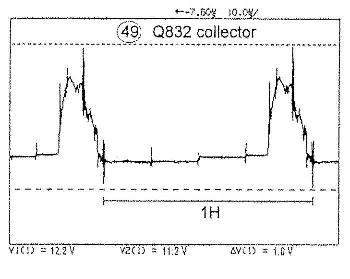
- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

Circuit No.	Pin No.	Voltage VDC
Q801	B	11.8
	C	172.8
	E	11.2
Q802	B	5.3
	C	11.2
	E	4.9
Q803	B	4.1
	C	0
	E	4.2
Q804	B	4.8
	C	4.5
	E	4.6
Q831	B	11.8
	C	175.8
	E	11.3
Q832	B	5.2
	C	11.2
	E	4.8

Circuit No.	Pin No.	Voltage VDC
Q833	B	4.1
	C	0
	E	4.2
Q835	B	1.9
	C	4.8
	E	4.5
Q861	B	11.8
	C	191.2
	E	11.2
Q862	B	5.1
	C	11.2
	E	4.7
Q863	B	4.1
	C	0
	E	4.2
Q865	B	2.3
	C	4.7
	E	4.5

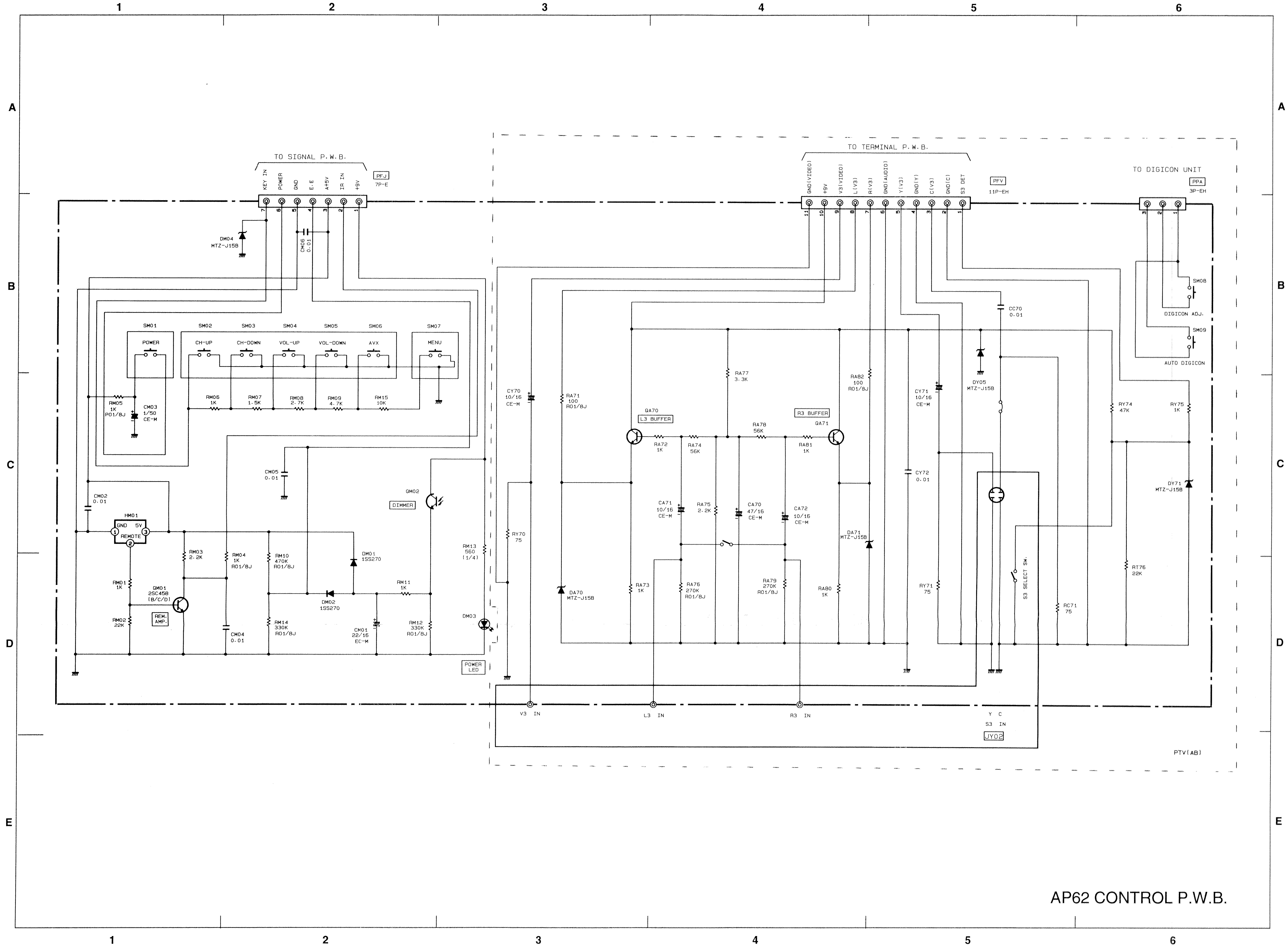

(48) Q832 emitter


(50) Q831 collector


(49) Q832 collector

BASIC CIRCUIT DIAGRAM

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

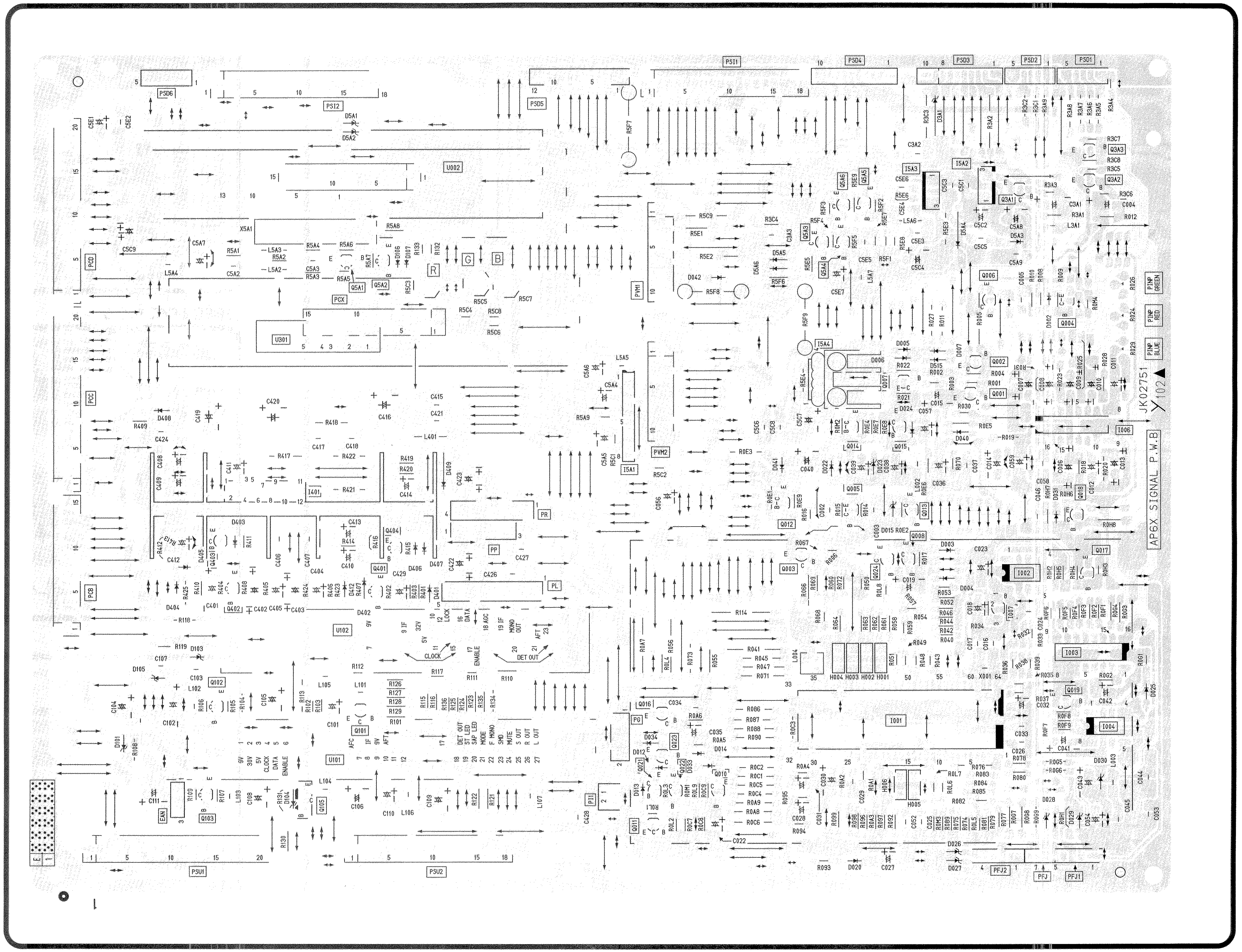

1
2
3
4
5
6
A
B
C
D
E
TO SIGNAL P.W.B.
KEY IN
POWER
GND
E.E
A+5V
IR IN
+5V
PFJ
7P-E
DM04
MTZ-J15B
CM06
0.01
SM01
SM02
SM03
SM04
SM05
SM06
SM07
POWER
CH-UP
CH-DOWN
VOL-UP
VOL-DOWN
AVX
MENU
RM05
1K
P01/8J
CM03
1/50
CE-M
RM06
1K
RM07
1.5K
RM08
2.7K
RM09
4.7K
RM15
10K
CM05
0.01
CM02
0.01
HM01
GND 5V
REMOTE
RM03
2.2K
RM04
1K
R01/8J
RM10
470K
R01/8J
DM01
1SS270
QM02
DIMMER
RM01
1K
QM01
2SC458
(B/C/D)
RM02
22K
REM.
AMP.
CM04
0.01
RM14
330K
R01/8J
DM02
1SS270
CM01
22/16
EC-M
RM11
1K
RM12
330K
R01/8J
RM13
560
(1/4)
DM03
POWER
LED
RY70
75
CY70
10/16
CE-M
RA71
100
R01/8J
DA70
MTZ-J15B
V3 IN
TO TERMINAL P.W.B.
GND(VIDEO)
+5V
V3(VIDEO)
L(V3)
R(V3)
GND(AUDIO)
Y(V3)
GND(Y)
C(V3)
GND(C)
S3 DET
PFV
11P-EH
QA70
L3 BUFFER
RA72
1K
RA74
56K
RA77
3.3K
RA78
56K
CA71
10/16
CE-M
RA75
2.2K
CA70
47/16
CE-M
CA72
10/16
CE-M
RA73
1K
RA76
270K
R01/8J
RA79
270K
R01/8J
L3 IN
R3 IN
R3 BUFFER
QA71
RA81
1K
RA82
100
R01/8J
DA71
MTZ-J15B
RA80
1K
CY71
10/16
CE-M
CY72
0.01
RY71
75
CC70
0.01
DY05
MTZ-J15B
S3 SELECT SW.
RC71
75
Y C
S3 IN
JY02
TO DIGICON UNIT
PPA
3P-EH
SM08
DIGICON ADJ.
SM09
AUTO DIGICON
RY74
47K
RY75
1K
DY71
MTZ-J15B
RT76
22K
PTV(AB)
AP62 CONTROL P.W.B.

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

Circuit No.	Pin No.	Voltage VDC
QM01	B	0.7
	C	0.1
	E	0
QM02	B	—
	C	1.6
	E	9.1

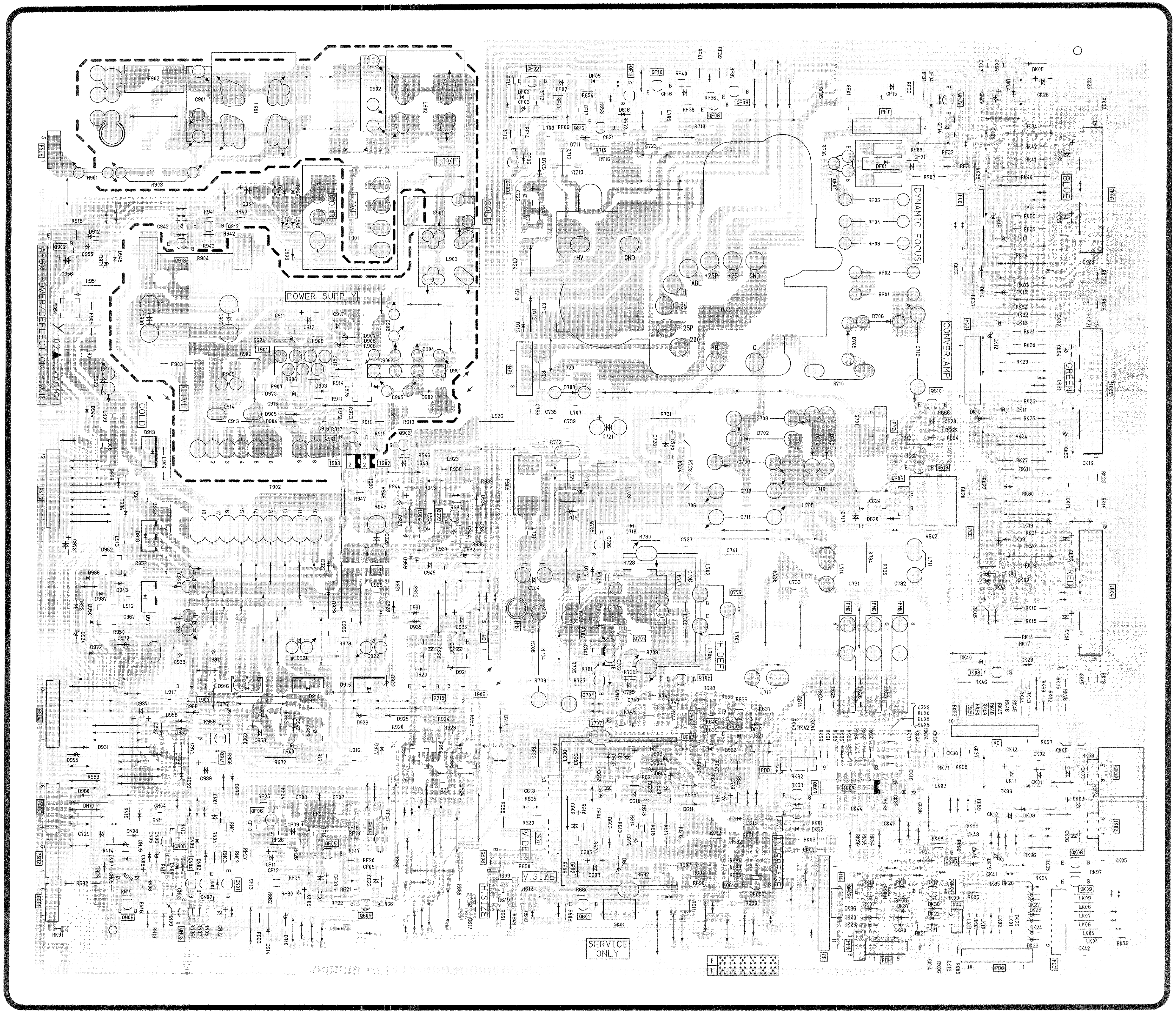
PRINTED CIRCUIT BOARD

SIGNAL P.C.B.

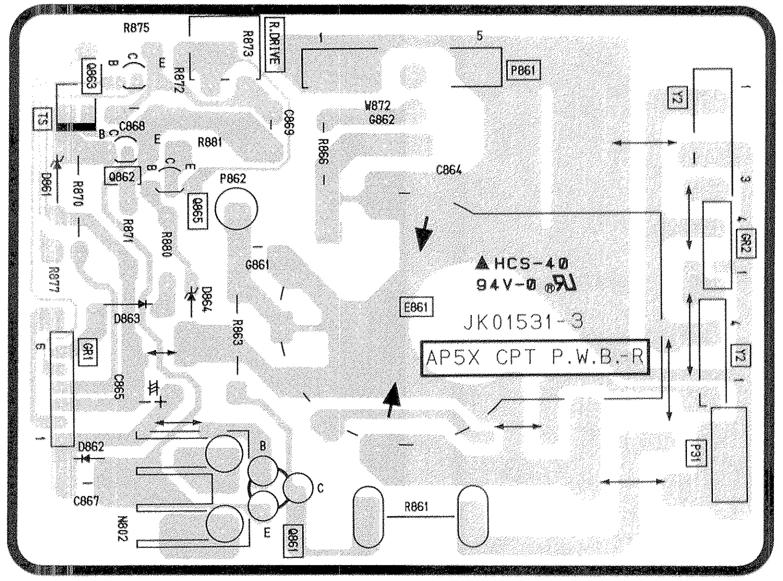

AP6X SIGNAL P.W.B
JK02751
Y102
PSI1
PSD4
PSD3
PSD2
PSD1
PSD6
PSI2
PSD5
PCD
PCC
PCB
PCX
PVM1
PVM2
PG
PI1
PSU1
PSU2
PFJ2
PFJ
PFJ1
PR
PP
PL
PINP GREEN
PINP RED
PINP BLUE
U002
U301
U102
U101
I001
I002
I003
I004
I006
I007
I401
I5A1
I5A2
I5A3
I5A4
X5A1
X001
CLOCK
DET OUT
R
G
B

PRINTED CIRCUIT BOARD

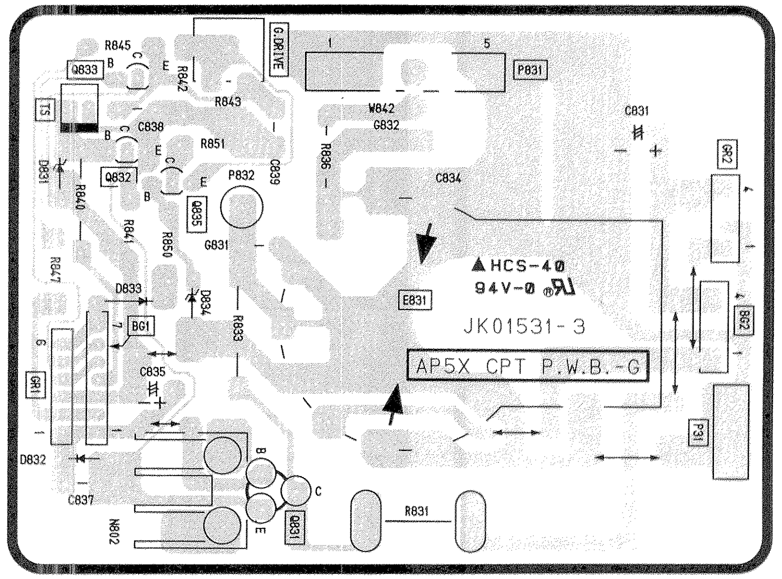
POWER/DEFLECTION P.C.B.


AP6X POWER/DEFLECTION P.W.B.
X102 ▲ JK03161
POWER SUPPLY
LIVE
COLD
HV
GND
ABL
+25P
+25
-25
-25P
200
+B
DYNAMIC FOCUS
CONVER. AMP
BLUE
GREEN
RED
H.DEF
V.DEF
V.SIZE
H.SIZE
INTERFACE
SERVICE ONLY

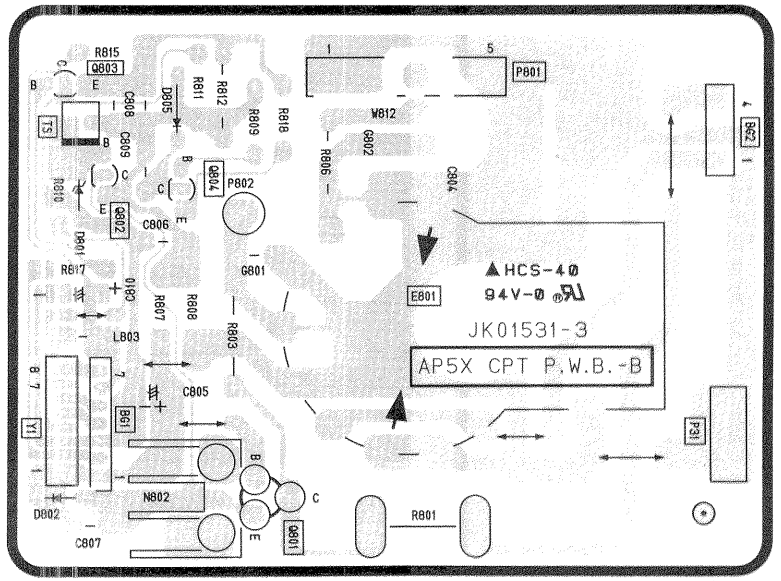
RED CPT P.C.B.


R.DRIVE
▲HCS-40
94V-0
JK01531-3
AP5X CPT P.W.B.-R

GREEN CPT P.C.B.

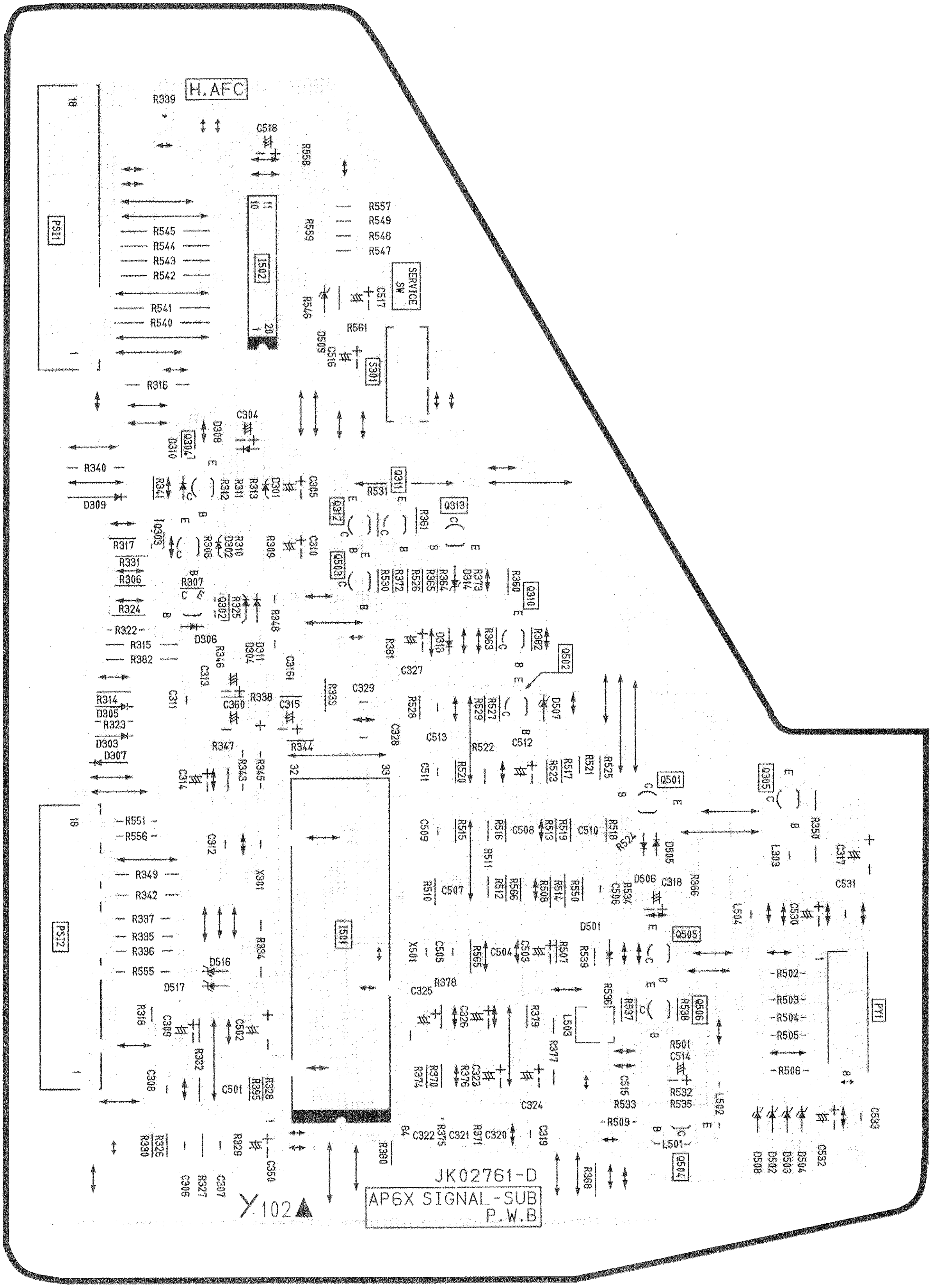

G.DRIVE
▲HCS-40
94V-0
JK01531-3
AP5X CPT P.W.B.-G

BLUE CPT P.C.B.

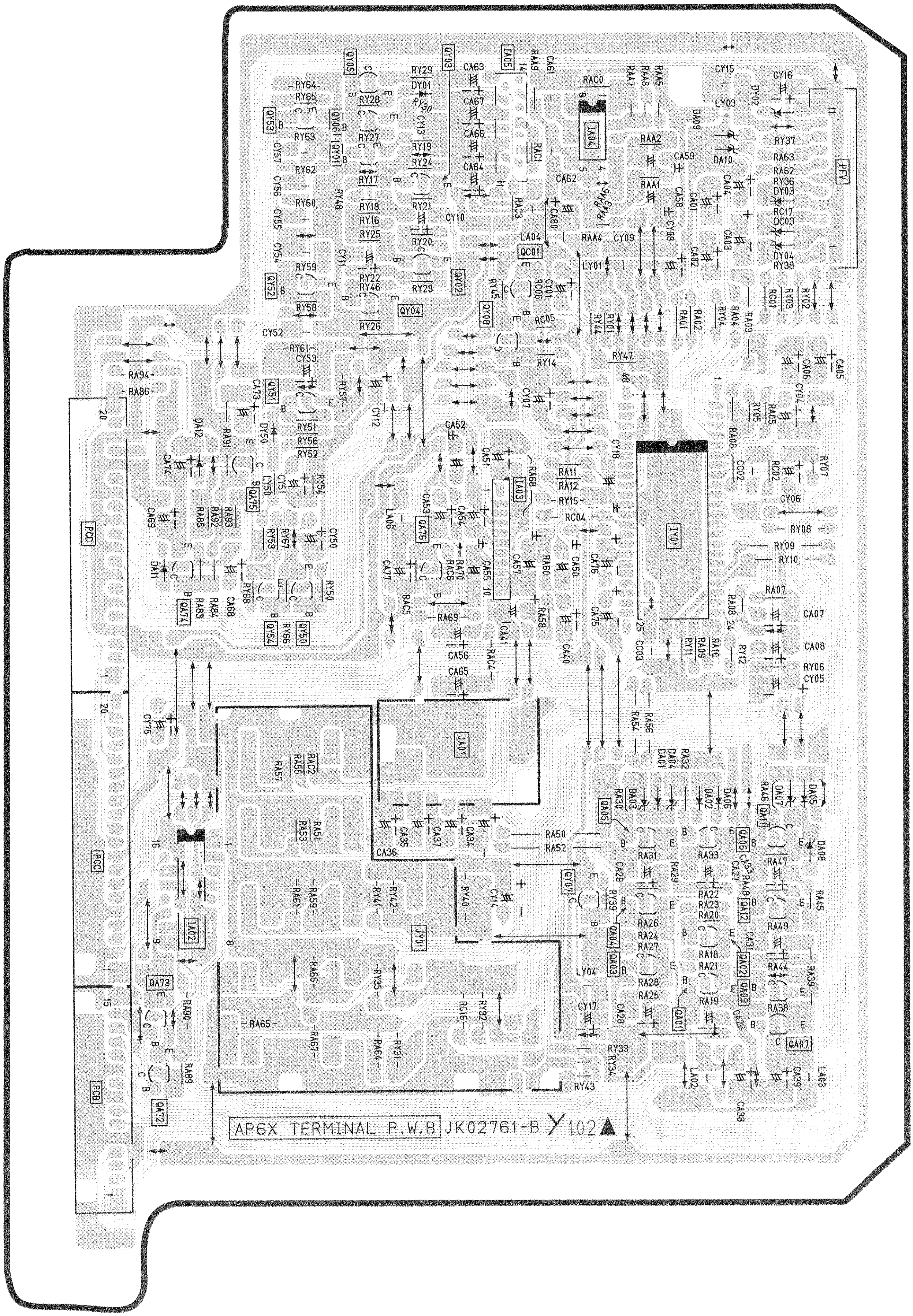

▲HCS-40
94V-0
JK01531-3
AP5X CPT P.W.B.-B

PRINTED CIRCUIT BOARD

SIGNAL SUB P.C.B.

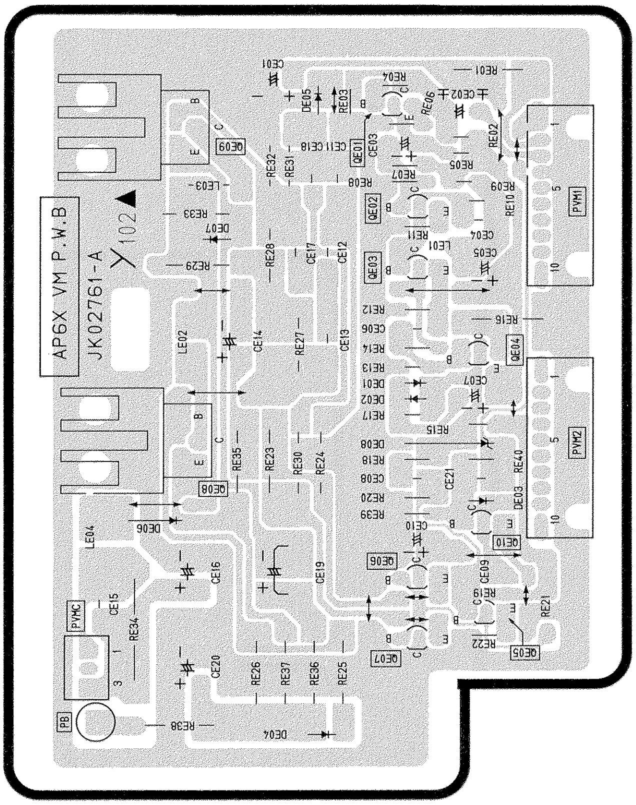

H.AFC
R339
C518
R558
PSI1
18
1
I502
11
10
20
1
R557
R549
R548
R547
R559
R545
R544
R543
R542
R541
R540
SERVICE SW
C517
R546
R561
D509
C516
S301
R316
C304
D308
Q304
D310
R340
D309
R341
R312
R311
R313
D301
C305
Q311
R531
Q313
Q312
R361
Q303
R317
R331
R306
R308
D302
R310
R309
C310
Q503
R530
R372
R526
R365
R364
D314
R373
R360
Q310
R307
R324
Q302
R325
R348
R322
R315
R382
D306
R346
D311
D304
C316
R381
D313
R363
R362
Q502
C327
C313
R314
D305
R323
D303
D307
C311
C360
R338
C315
R333
C329
R528
R529
R527
D507
C328
C513
R522
C512
R347
R344
R343
R345
C314
32
33
C511
R520
R523
R517
R521
R525
Q501
Q305
PSI2
18
1
R551
R556
C312
X301
C509
R515
R516
C508
R513
R519
C510
R518
R524
D505
R350
L303
C317
R349
R342
R511
R510
C507
R512
R566
R508
R514
R550
C506
R534
D506
C318
R366
C531
L504
C530
R337
R335
R336
R334
I501
X501
C505
R565
C504
C503
R507
R539
D501
Q505
R555
D516
D517
R502
R503
R504
R505
R506
PY1
C325
R378
R536
R537
R538
Q506
R318
C309
C502
R332
C326
R379
L503
R377
C308
C501
R395
R328
R374
R370
R376
C323
C324
C515
R533
R501
C514
R532
R535
L502
C533
C532
R509
L501
Q504
64
C322
R375
C321
R371
C320
C319
R326
R330
R329
C350
C306
R327
C307
R380
R368
D508
D502
D503
D504
JK02761-D
AP6X SIGNAL-SUB P.W.B
Y102

PRINTED CIRCUIT BOARD

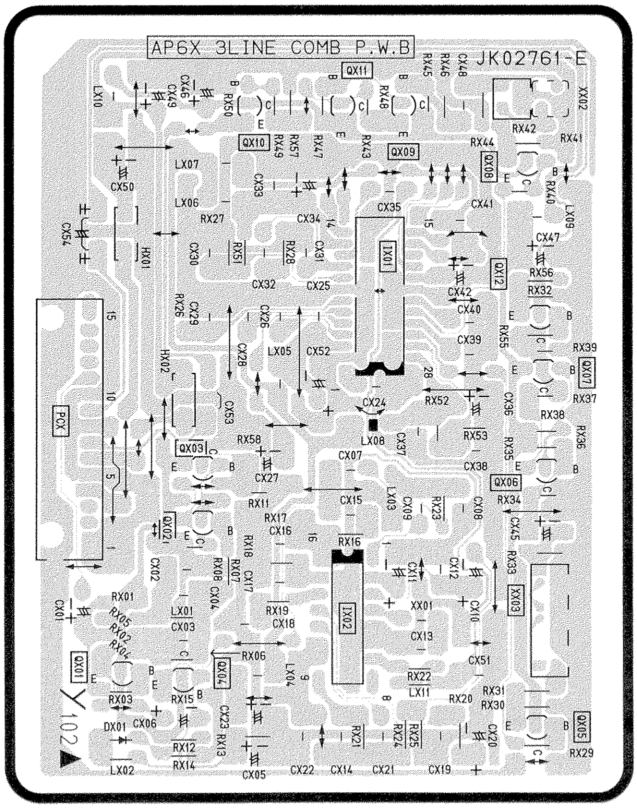

AP6X TERMINAL P.W.B JK02761-B Y102
IY01
IA01
IA02
IA03
IA04
IA05
JA01
JY01
PCD
PCC
PCB
PFV
QY01
QY02
QY03
QY04
QY05
QY06
QY07
QY08
QY50
QY51
QY52
QY53
QY54
QC01
QA01
QA02
QA03
QA04
QA05
QA06
QA07
QA09
QA11
QA12
QA72
QA73
QA74
QA75
QA76

PRINTED CIRCUIT BOARD

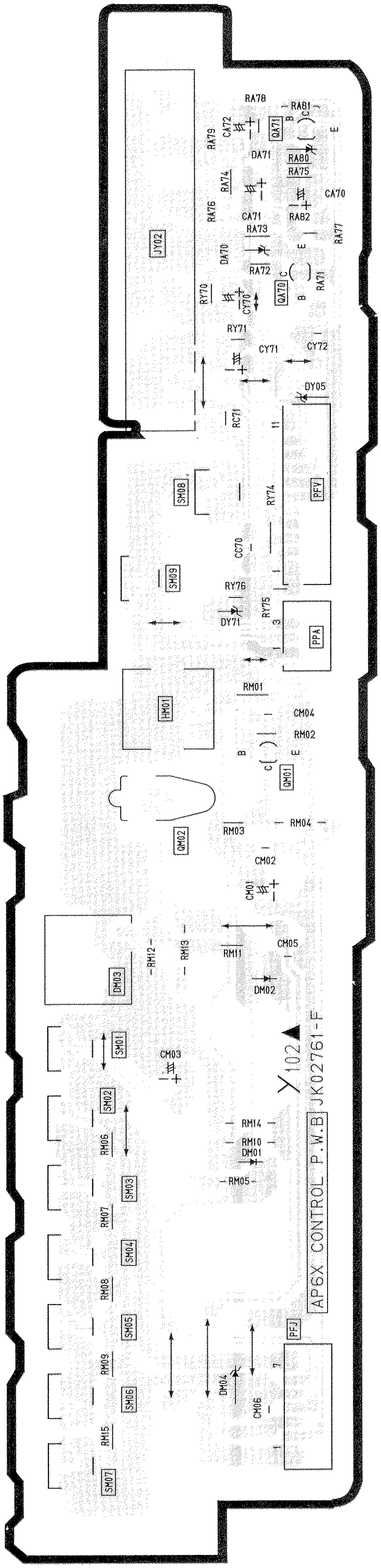
VM P.C.B.


AP6X VM P.W.B
JK02761-A
Y102
PVM1
PVM2
PVMC
PB

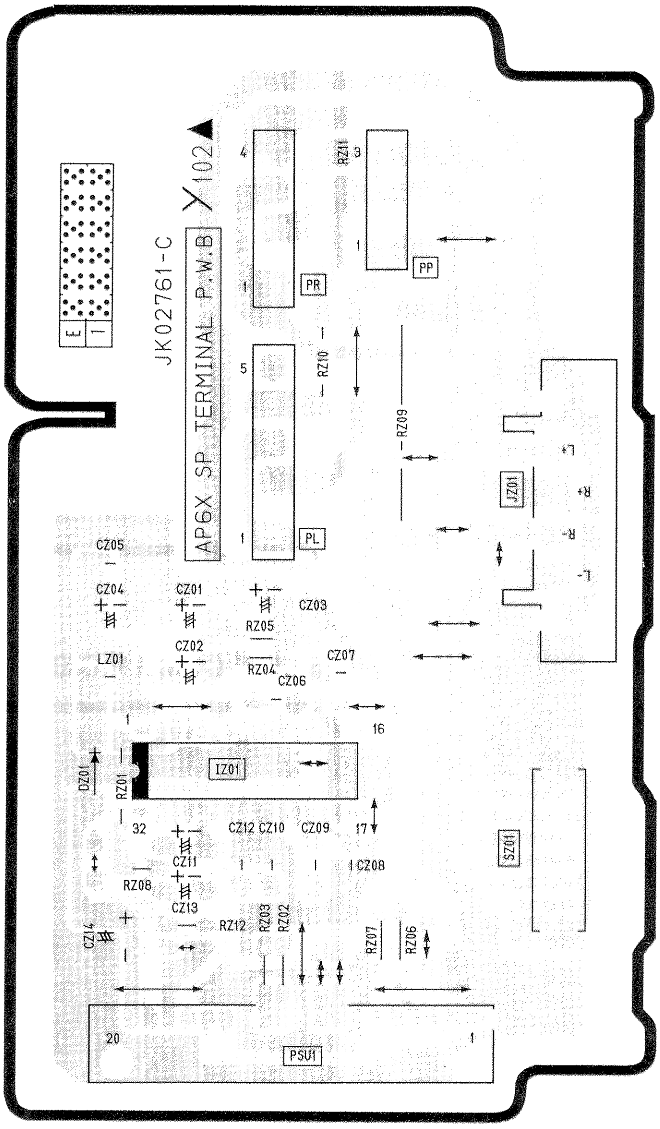
3 LINE COMB P.C.B.


AP6X 3LINE COMB P.W.B
JK02761-E
Y102
PCX
IX01
IX02
QX01
QX02
QX03
QX04
QX05
QX06
QX07
QX08
QX09
QX10
QX11
QX12

CONTROL P.C.B.

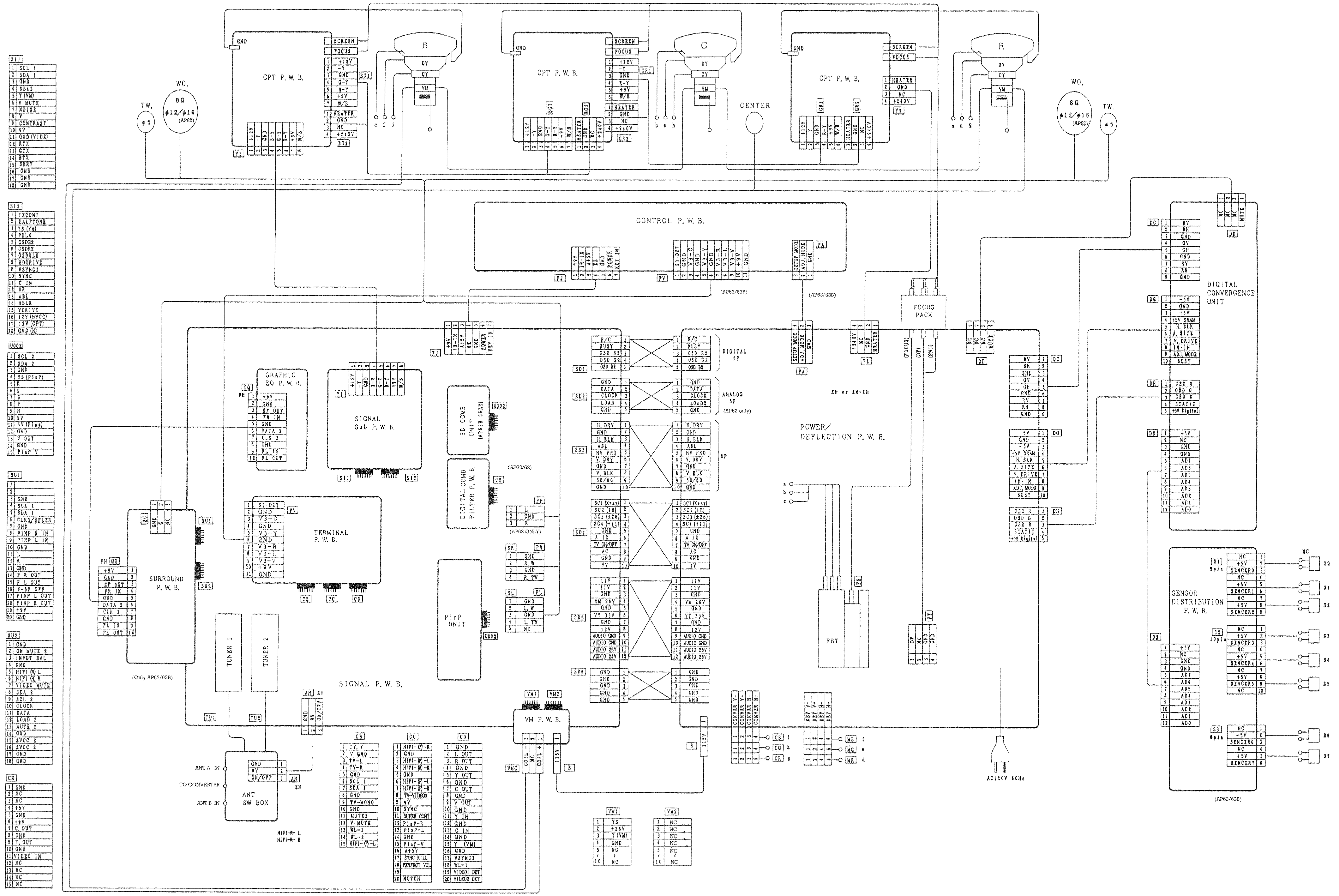

JY02
RA78
RA81
RA79
CA72
QA71
DA71
RA80
RA75
RA74
CA70
RA76
CA71
RA82
RA73
RA77
DA70
RA72
QA70
RA71
RY70
CY70
RY71
CY71
CY72
DY05
RC71
SM08
RY74
PFV
CC70
SM09
RY76
DY71
RY75
PPA
RM01
HM01
CM04
RM02
QM01
QM02
RM04
RM03
CM02
CM01
RM12
RM13
RM11
CM05
DM03
DM02
SM01
CM03
X102▲
JK02761-F
AP6X CONTROL P.W.B
SM02
RM06
RM14
RM10
DM01
RM05
SM03
RM07
SM04
RM08
SM05
PFJ
RM09
DM04
SM06
CM06
RM15
SM07

SP TERMINAL P.C.B.


E
1
JK02761-C
AP6X SP TERMINAL P.W.B
X102▲
PR
RZ11
PP
RZ10
PL
RZ09
JZ01
L+
R+
R-
L-
CZ05
CZ04
CZ01
CZ03
RZ05
LZ01
CZ02
RZ04
CZ07
CZ06
IZ01
DZ01
RZ01
16
32
CZ12
CZ10
CZ09
17
CZ08
CZ11
RZ08
CZ13
CZ14
RZ12
RZ03
RZ02
RZ07
RZ06
SZ01
20
PSU1

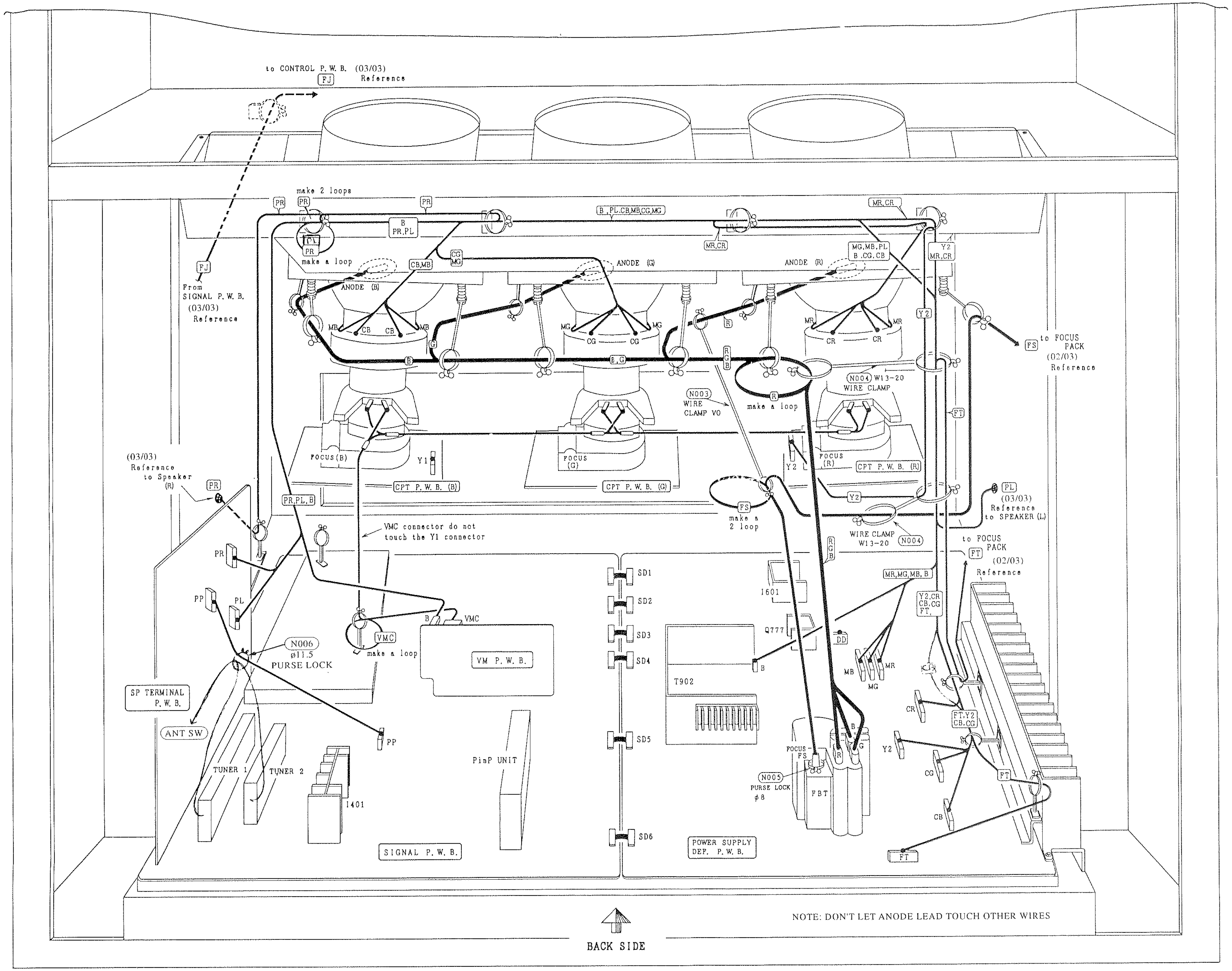
WIRING DIAGRAM

50FX18B
50FX19K
55FX20B



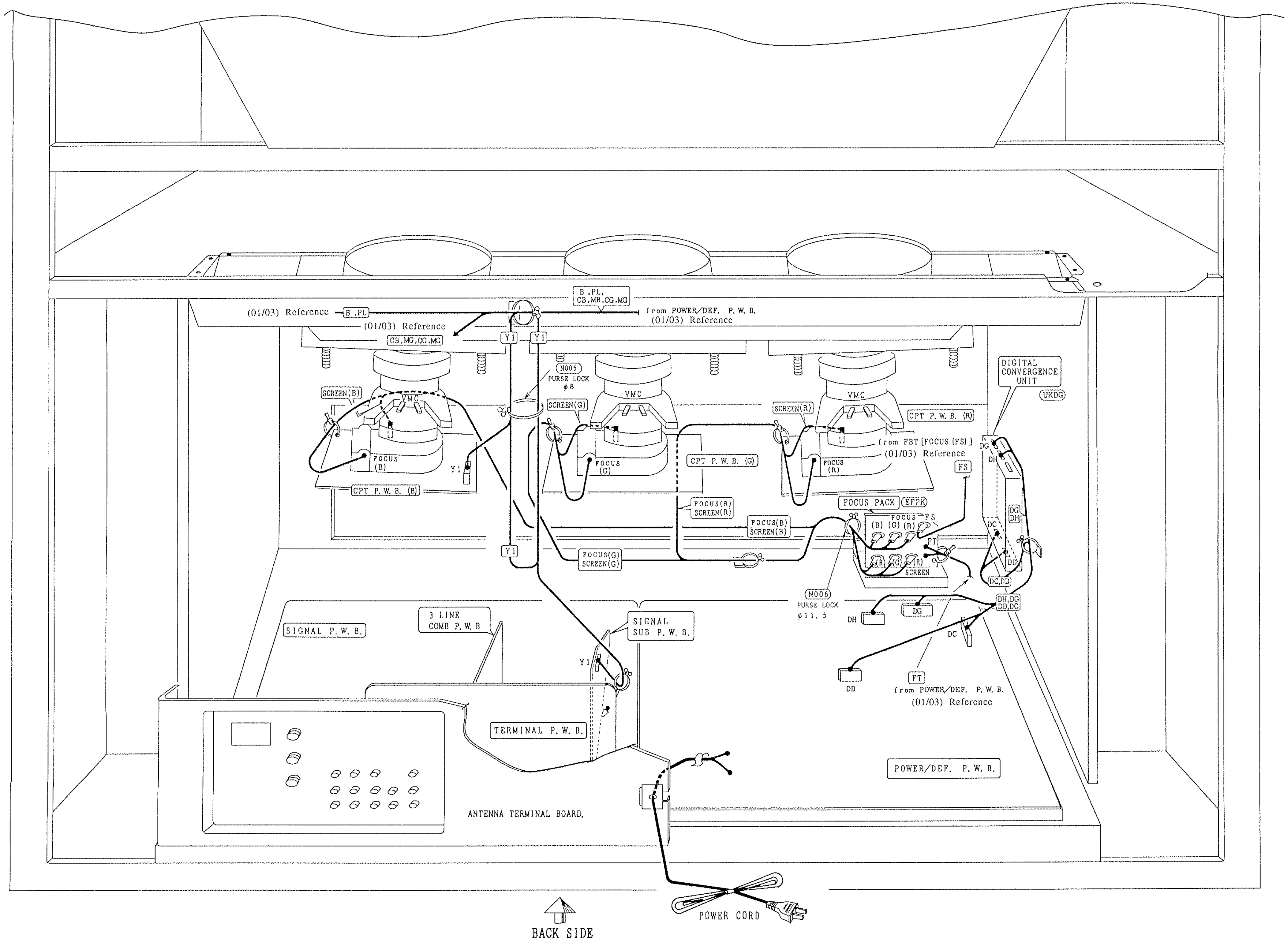
SI1
1 SCL 1
2 SDA 1
3 GND
4 SBLS
5 Y (VM)
6 V MUTE
7 NOISE
8 V
9 CONTRAST
10 9V
11 GND (VIDE)
12 RTX
13 GTX
14 BTX
15 SBRT
16 GND
17 GND
18 GND
SI2
1 TXCONT
2 HALFTONE
3 YS (VM)
4 PBLK
5 OSDG2
6 OSDR2
7 OSDBLK
8 HDDRIVE
9 VSYNC2
10 SYNC
11 C IN
12 NR
13 ABL
14 HBLK
15 VDRIVE
16 12V (HVCC)
17 12V (CPT)
18 GND (H)
U002
1 SCL 2
2 SDA 2
3 GND
4 YS (PinP)
5 R
6 G
7 B
8 V
9 H
10 9V
11 5V (Pinp)
12 GND
13 V OUT
14 GND
15 PinP V
SU1
3 GND
4 SCL 1
5 SDA 1
6 CLK3/SPLZR
7 GND
8 PINP R IN
9 PINP L IN
10 GND
11 L
12 R
13 GND
14 F R OUT
15 F L OUT
16 F-SP OFF
17 PINP L OUT
18 PINP R OUT
19 +9V
20 GND
SU2
1 GND
2 ON MUTE 2
3 INPUT BAL
4 GND
5 HIFI (R) L
6 HIFI (R) R
7 VIDEO MUTE
8 SDA 2
9 SCL 2
10 CLOCK
11 DATA
12 LOAD 2
13 MUTE 2
14 GND
15 SVCC 2
16 SVCC 2
17 GND
18 GND
CX
1 GND
2 NC
3 NC
4 +5V
5 GND
6 +9V
7 C. OUT
8 GND
9 Y. OUT
10 GND
11 VIDEO IN
12 NC
13 NC
14 NC
15 NC
TW. ϕ5
WO. 8Ω ϕ12/ϕ16 (AP62)
CPT P. W. B.
B
G
R
DY
CY
VM
SCREEN
FOCUS
+12V
-Y
GND
G-Y
R-Y
+9V
W/B
HEATER
NC
+240V
BG1
BG2
GR1
GR2
Y1
Y2
c f i
b e h
a d g
CENTER
CONTROL P. W. B.
PJ
PV
PA
(AP63/63B)
FOCUS PACK
DIGITAL CONVERGENCE UNIT
DC
DG
DH
DS
DD
GRAPHIC EQ P. W. B.
SIGNAL Sub P. W. B.
3D COMB UNIT (AP53B ONLY)
DIGITAL COMB FILTER P. W. B.
TERMINAL P. W. B.
SURROUND P. W. B.
PinP UNIT
TUNER 1
TUNER 2
SIGNAL P. W. B.
(Only AP63/63B)
ANT SW BOX
ANT A IN
TO CONVERTER
ANT B IN
VM P. W. B.
POWER/ DEFLECTION P. W. B.
FBT
DIGITAL 5P
ANALOG 5P (AP62 only)
8P
EH or EH-EH
SD1
SD2
SD3
SD4
SD5
SD8
AC120V 60Hz
SENSOR DISTRIBUTION P. W. B.
S1 9pin
S2 10pin
S3 6pin
(AP63/63B)
VM1
1 YS
2 +26V
3 Y (VM)
4 GND
5 NC
10 NC
VM2
1 NC
2 NC
3 NC
4 NC
5 NC
10 NC
HIFI-R- L
HIFI-R- R

WIRE DRESS DRAWING (1/3)

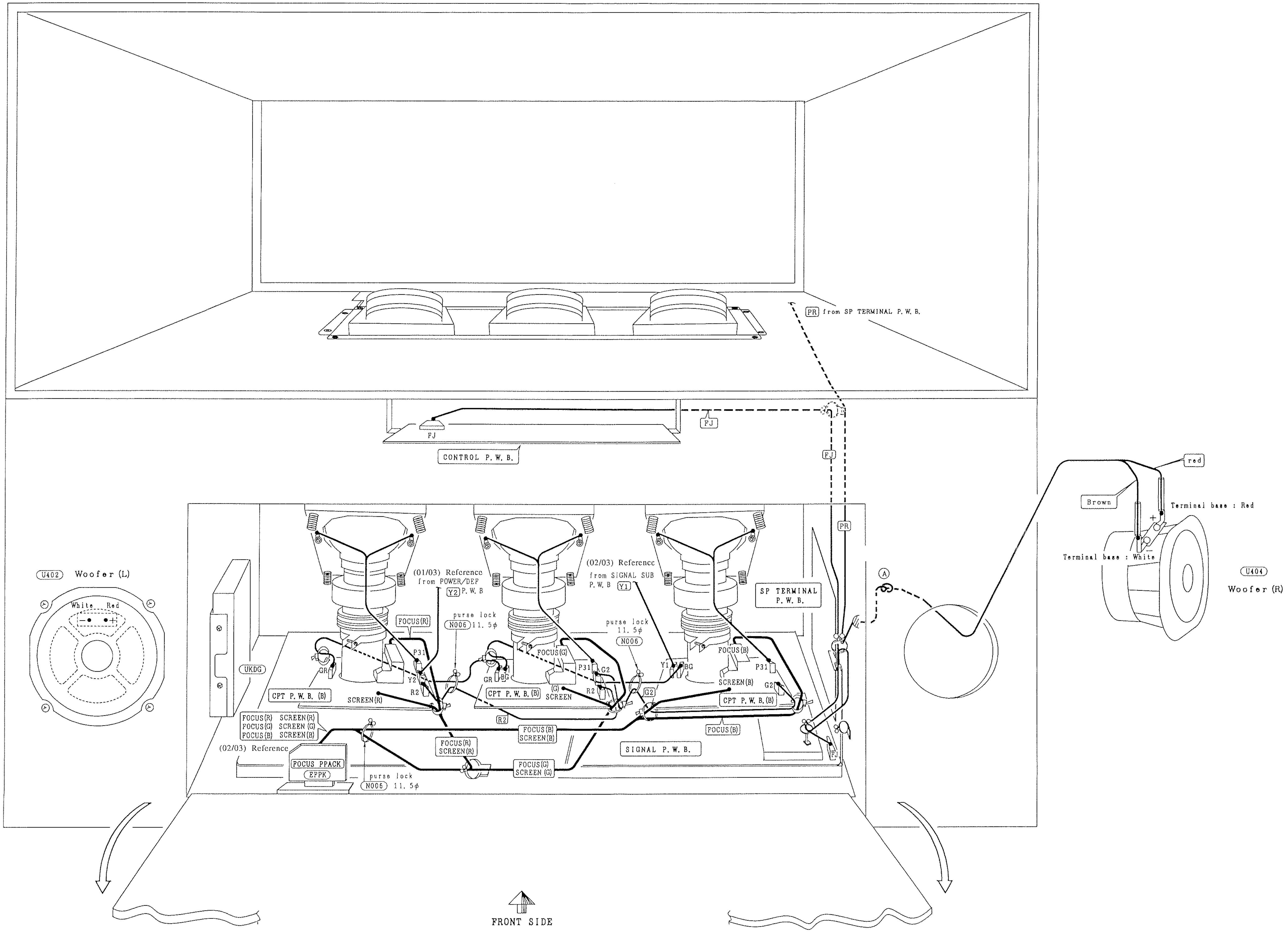

to CONTROL P. W. B. (03/03)
FJ
Reference
make 2 loops
PR
PR
PR
B
PR,PL
B , PL.CB,MB,CG,MG
MR,CR
MR,CR
PL
PR
make a loop
CB,MB
CG
MG
ANODE (G)
ANODE (R)
MG,MB,PL
B ,CG,CB
Y2
MR,CR
FJ
From
SIGNAL P. W. B.
(03/03)
Reference
ANODE (B)
MB
CB
CB
MB
G
MG
CG
CG
MG
R
MR
CR
CR
MR
Y2
B
B,G
R
G
B
FS
to FOCUS
PACK
(02/03)
Reference
N004
W13-20
WIRE CLAMP
N003
WIRE
CLAMP VO
R
make a loop
FT
FOCUS (B)
Y1
FOCUS
(G)
FOCUS
(R)
Y2
CPT P. W. B. (R)
(03/03)
Reference
to Speaker
(R)
PR
CPT P. W. B. (B)
CPT P. W. B. (G)
FS
make a
2 loop
Y2
PL
(03/03)
Reference
to SPEAKER (L)
PR,PL, B
VMC connector do not
touch the Y1 connector
WIRE CLAMP
W13-20
N004
to FOCUS
PACK
FT
(02/03)
Reference
R
G
B
PR
SD1
SD2
SD3
SD4
SD5
SD6
I601
MR,MG,MB, B
Y2,CR
CB,CG
FT,
PP
PL
B
VMC
VMC
make a loop
N006
ø11.5
PURSE LOCK
VM P. W. B.
Q777
DD
B
T902
MB
MG
MR
CR
FT,Y2
CB,CG
SP TERMINAL
P. W. B.
ANT SW
PP
TUNER 1
TUNER 2
I401
PinP UNIT
FOCUS
FS
R
B
G
N005
PURSE LOCK
φ8
FBT
Y2
CG
FT
CB
FT
SIGNAL P. W. B.
POWER SUPPLY
DEF. P. W. B.
BACK SIDE

NOTE: DON'T LET ANODE LEAD TOUCH OTHER WIRES

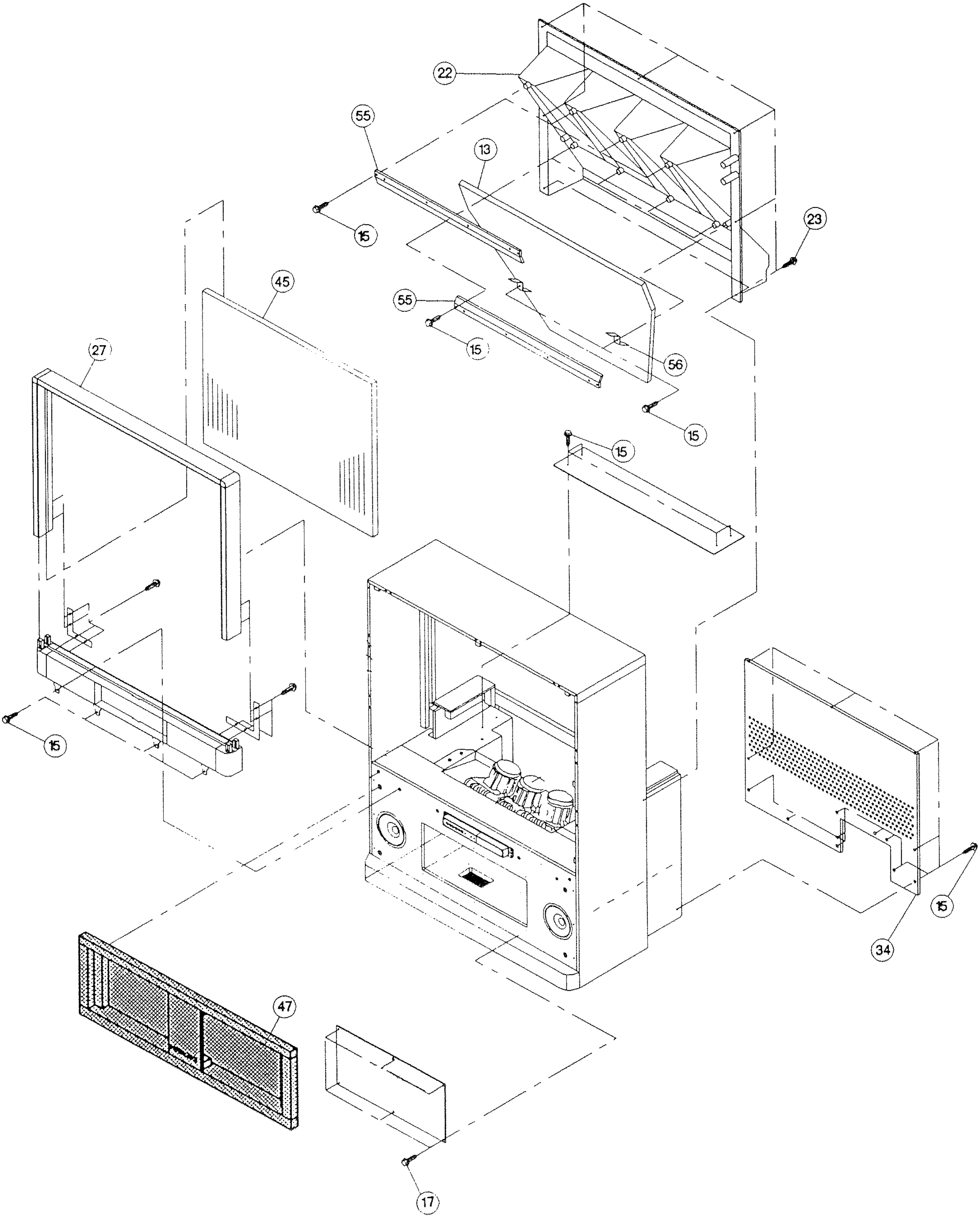
WIRE DRESS DRAWING (2/3)


B ,PL,
CB,MB,CG,MG
(01/03) Reference
B ,PL
from POWER/DEF. P. W. B.
(01/03) Reference
(01/03) Reference
CB,MG,CG,MG
Y1
Y1
N005
PURSE LOCK
ϕ8
SCREEN(B)
VMC
FOCUS
(B)
Y1
CPT P. W. B. (B)
SCREEN(G)
VMC
FOCUS
(G)
CPT P. W. B. (G)
SCREEN(R)
VMC
FOCUS
(R)
CPT P. W. B. (R)
from FBT [FOCUS (FS)]
(01/03) Reference
FS
DIGITAL
CONVERGENCE
UNIT
UKDG
DG
DH
FOCUS(R)
SCREEN(R)
FOCUS(B)
SCREEN(B)
FOCUS PACK
EFPK
FOCUS
(B) (G) (R)
FS
FT
(B) (G) (R)
SCREEN
DG
DH
DC
DD
DC,DD
Y1
FOCUS(G)
SCREEN(G)
N006
PURSE LOCK
ϕ11. 5
DH
DG
DH,DG
DD,DC
DC
DD
FT
from POWER/DEF. P. W. B.
(01/03) Reference
SIGNAL P. W. B.
3 LINE
COMB P. W. B
SIGNAL
SUB P. W. B.
Y1
TERMINAL P. W. B.
ANTENNA TERMINAL BOARD.
POWER/DEF. P. W. B.
POWER CORD
BACK SIDE

WIRE DRESS DRAWING (3/3)

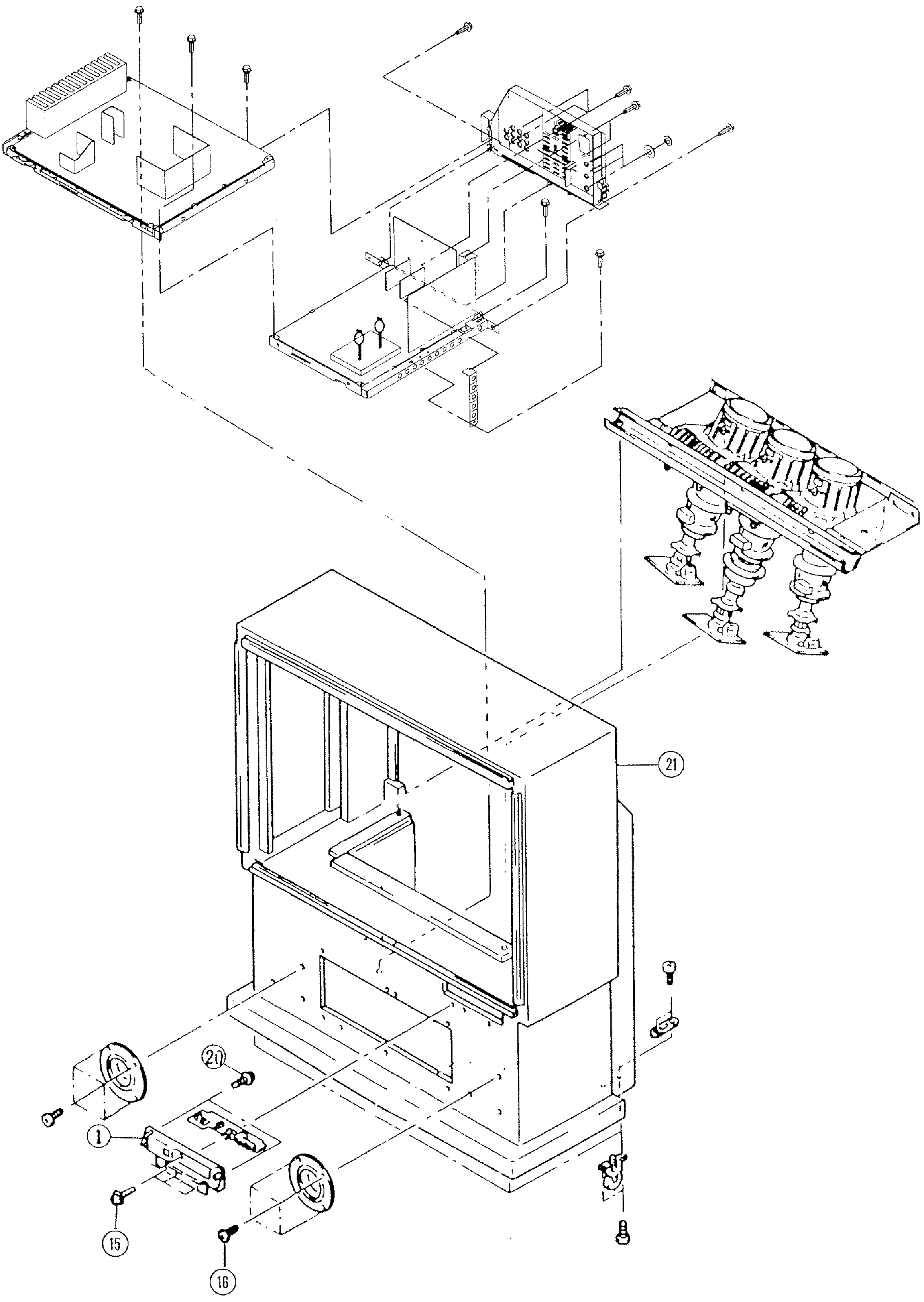

PR from SP TERMINAL P. W. B.
FJ
FJ
FJ
CONTROL P. W. B.
PR
red
Brown
Terminal base : Red
Terminal base : White
+
−
U404
Woofer (R)
A
U402
Woofer (L)
White
Red
− ● ● +
UKDG
(01/03) Reference
from POWER/DEF
Y2 P. W. B
purse lock
N006 11. 5ϕ
FOCUS(R)
P31
Y2
R2
GR
CPT P. W. B. (B)
SCREEN(R)
GR
BG
FOCUS(G)
P31
G2
R2
CPT P. W. B. (B)
(G)
SCREEN
R2
(02/03) Reference
from SIGNAL SUB
P. W. B Y1
purse lock
11. 5ϕ
N006
Y1
BG
G2
FOCUS(B)
P31
SCREEN(B)
G2
CPT P. W. B. (B)
SP TERMINAL
P. W. B.
FOCUS(R) SCREEN(R)
FOCUS(G) SCREEN (G)
FOCUS(B) SCREEN(B)
(02/03) Reference
FOCUS PPACK
EFPK
purse lock
N006 11. 5ϕ
FOCUS(R)
SCREEN(R)
FOCUS(B)
SCREEN(B)
FOCUS(G)
SCREEN (G)
FOCUS(B)
SIGNAL P. W. B.
FJ
FRONT SIDE

EXPLODED VIEW (1/3)


22
55
13
15
23
45
55
15
56
27
15
15
15
34
15
47
17

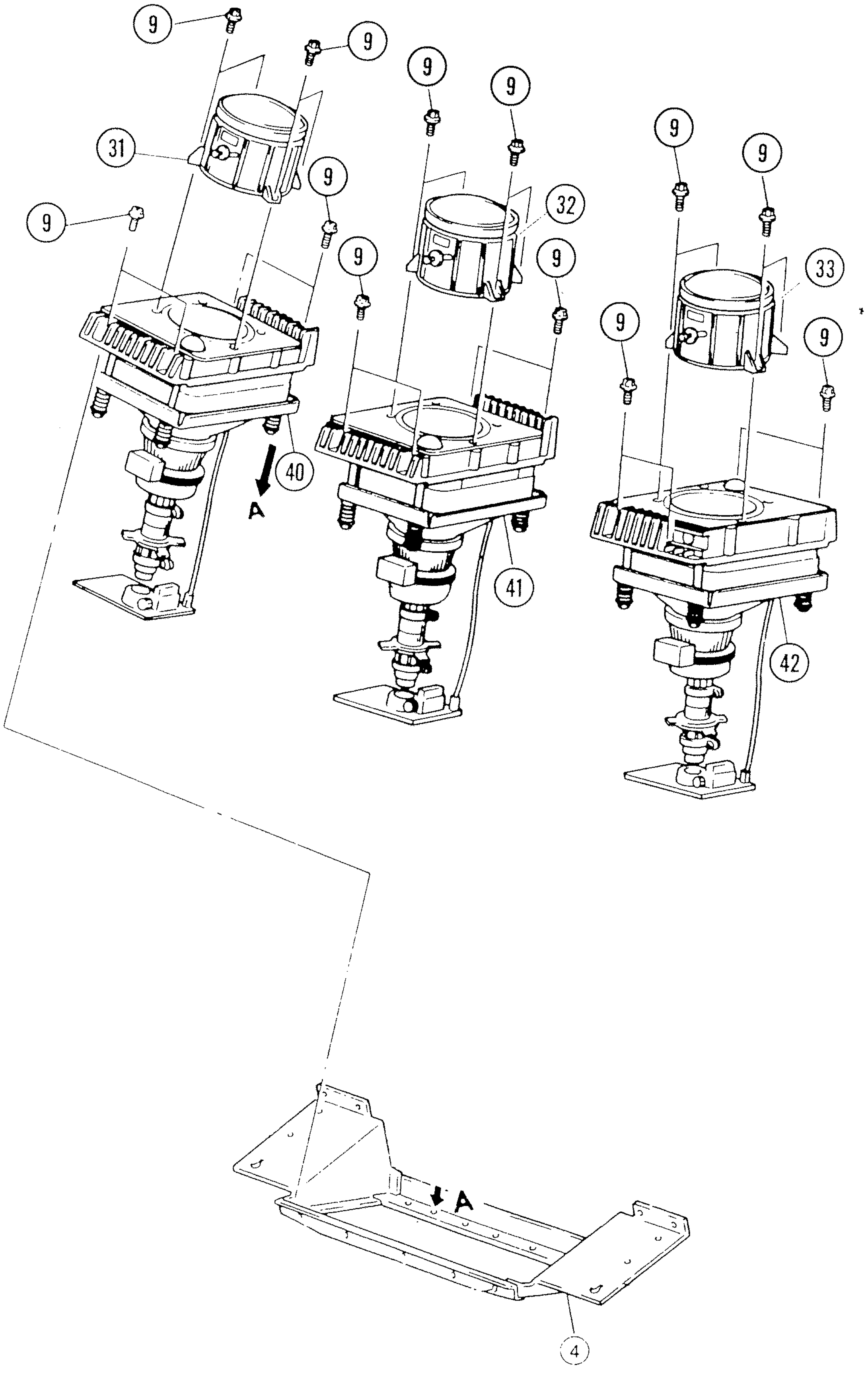
Note: Some parts may appear different than those shown in the exploded view. When ordering, refer to the REPLACEMENT PARTS LIST for correct part number. Since this Service Manual covers several models, use care to select the correct part for the model being serviced.

EXPLODED VIEW (2/3)



Note: Some parts may appear different than those shown in the exploded view. When ordering, refer to the REPLACEMENT PARTS LIST for correct part number. Since this Service Manual covers several models, use care to select the correct part for the model being serviced.

EXPLODED VIEW (3/3)



Note: Some parts may appear different than those shown in the exploded view. When ordering, refer to the REPLACEMENT PARTS LIST for correct part number. Since this Service Manual covers several models, use care to select the correct part for the model being serviced.

REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characters important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

ABBREVIATIONS

Capaitors:	CD:	Ceramic Disc	**Resistors:**	CF:	Carbon Film	**Semiconductors:**	TR: Transistor
	PF:	Polyester Film		CC:	Carbon Composition		DI: Diode
	EL:	Electrolytic		MF:	Metal Oxide Film		ZD: Zener Diode
	PP:	Polypropylene		VR:	Variable Resistor		VA Varistor
	PR:	Paper		WW:	Wire Wound		TH: Thermistor
	TA:	Tantalum		FR:	Fuse Resistor		IC: Integrated Circuit
	TM:	Trimmer		MG:	Metal Glaze		

CIRCUIT BLOCK	SECOND CHARACTER OF SYMBOL NO.	CIRCUIT BLOCK	SECOND CHARACTER OF SYMBOL NO.	CIRCUIT BLOCK	SECOND CHARACTER OF SYMBOL NO.
System Control	0	Signal Control (include composite)	Y	CPT	8
Tuner	1	Signal Control (include BPF)	C	Horizontal Deflection	7
Signal (Y) & SYNC.	3	Signal Control (include MTS)	A	Vertical Deflection	6
Signal (Chroma)	5	PIP	P	Dynamic Focus	F
3 Line Comb	X	VM	E	Convergence	K
Sound	4	CONTROL	M	Sensor Distribution	L
Surround	S			Power Supply	9
MTS	W			Graphic Eq.	G
SP Terminal	Z				

SYMBOL NO.	PART NO.	PART DESCRIPTION
		CAPACITORS
CA01	0800003R	EL 1.0UF-M 50V
CA02	0800003R	EL 1.0UF-M 50V
CA05	0800003R	EL 1.0UF-M 50V
CA06	0800003R	EL 1.0UF-M 50V
CA07	0800003R	EL 1.0UF-M 50V
CA08	0800003R	EL 1.0UF-M 50V
CA26	0800015R	EL 10UF-M 16V
CA27	0800015R	EL 10UF-M 16V
CA28	0800015R	EL 10UF-M 16V
CA29	0800015R	EL 10UF-M 16V
CA31	0800015R	EL 10UF-M 16V
CA33	0800015R	EL 10UF-M 16V
CA34	0800015R	EL 10UF-M 16V
CA35	0800015R	EL 10UF-M 16V
CA36	0800015R	EL 10UF-M 16V
CA37	0800015R	EL 10UF-M 16V
CA38	0800041R	EL 47UF-M 16V
CA39	0800041R	EL 47UF-M 16V
CA40	0800015R	EL 10UF-M 16V
CA41	0800015R	EL 10UF-M 16V
CA50	0284634R	EL 4.7UF-M 50V
CA51	0800009R	EL 4.7UF-M 25V
CA52	0284634R	EL 4.7UF-M 50V
CA53	0800015R	EL 10UF-M 16V
CA54	0800015R	EL 10UF-M 16V
CA55	0284634R	EL 4.7UF-M 50V
CA56	0800015R	EL 10UF-M 16V
CA57	0284634R	EL 4.7UF-M 50V
CA68	0800015R	EL 10UF-M 16V
CA69	0800009R	EL 4.7UF-M 25V
CA73	0800015R	EL 10UF-M 16V
CA74	0800009R	EL 4.7UF-M 25V
CA75	0800003R	EL 1.0UF-M 50V
CA76	0800003R	EL 1.0UF-M 50V
CA80	0800015R	EL 10UF-M 16V
CA81	0800015R	EL 10UF-M 16V
CC02	0244171R	CD 0.01UF-Z F 50V TAPE
CE01	0800075F	EL 470UF-M 25V
CE02	0284621R	EL 0.47UF 50V (BP)
CE03	0800041R	EL 47UF-M 16V
CE04	0890081R	CD 330PF 50V
CE05	0800049R	EL 100UF-M .6V
CE06	0880044R	PF 0.01UF-KEB 50V
CE07	0800049R	EL 100UF-M .6V
CE08	0276717R	PF 0.1UF-J 50V (TF TYP E)
CE09	0276717R	PF. 0.1UF-J 50V (TF TYP E)
CE10	0800042R	EL 47UF-M 25V
CE11	0890074R	CD 100PF-J 50V
CE12	0244541F	CD 0.01MF-K B 500V
CE13	0244541F	CD 0.01MF-K B 500V
CE14	AL00009R	EL. 47UF 160V
CE15	0247848R	CD 56PF-J SL 500V
CE16	AL00007R	EL 220UF16
CE17	0244509R	CD 4700PF-KB B 500V
CE18	0890074R	CD 100PF-J 50V
CE19	AL00009R	EL 47UF 160V
CE20	AL00009R	EL 47UF 160V
CE21	0890077R	CD 180PF-K 50V
CF01	0800317R	EL 47UF-M(SMG) 16V
CF02	0800353R	EL 470UF-M 16V
CF03	0284638R	EL10UF-SME(BP) 16V
CF04	0800291R	EL10UF-M(SMG) 16V
CF05	0276721R	PF 0.22UF-J 50V (TF TY PE)
CF06	0800291R	EL10UF-M(SMG) 16V
CF07	0880041R	PF 0.0056UF-KEB50V
CF08	0244120R	CD 820PF-K B 50V
CF09	0284642R	EL10UF-SME(BP)50V
CF10	0890083R	CD 470PF-K 50V
CF11	0800291R	EL10UF-M(SMG) 16V
CF12	AN00062R	PF 103UF 50V
CF13	0890082R	CD 390PF-K 50V
CF14	0800353R	EL 470UF-M 16V
CF15	0284638R	EL10UF-SME(BP) 16V
CF16	0800291R	EL10UF-M(SMG) 16V
CF17	0244109R	CD 4700PF-KB 50V
CK01	0800326R	EL 100UF-M 16V
CK02	0244141R	CD 0.01UF-KB B 50V
CK03	0800326R	EL 100UF-M 16V

REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characters important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	PART DESCRIPTION
CK04	0244141R	CD 0.01UF-KB B 50V
CK05	AN00075R	PF 104UF 50V
CK06	0800326R	EL 100UF-M 16V
CK07	0800326R	EL 100UF-M 16V
CK08	AN00075R	PF 104UF 50V
CK10	0800353R	EL 470UF-M 16V
CK11	0800058R	EL 220UF-M 16V
CK13	AN00075R	PF 104UF 50V
CK14	AN00075R	PF 104UF 50V
CK15	0248688R	CD 150PF-J SL 50V
CK17	0248688R	CD 150PF-J SL 50V
CK19	0248688R	CD 150PF-J SL 50V
CK21	0248688R	CD 150PF-J SL 50V
CK23	0248688R	CD 150PF-J SL 50V
CK25	0248688R	CD 150PF-J SL 50V
CK27	0258175G	EL 470UF 50V
CK28	0258175G	EL 470UF 50V
CK29	0248688R	CD 150PF-J SL 50V
CK30	0248688R	CD 150PF-J SL 50V
CK31	0248688R	CD 150PF-J SL 50V
CK32	0248688R	CD 150PF-J SL 50V
CK33	0248688R	CD 150PF-J SL 50V
CK34	0248688R	CD 150PF-J SL 50V
CK35	0800041R	EL 47UF-M 16V
CK36	0800041R	EL 47UF-M 16V
CK37	AN00062R	PF 103UF 50V
CK38	AN00062R	PF 103UF 50V
CK39	AN00062R	PF 103UF 50V
CK40	AN00062R	PF 103UF 50V
CK41	0248688R	CD 150PF-J SL 50V
CK42	0880031R	PF 1000PF-K 50V
CK44	0244118R	CD 470PF-K 50V
CK45	0880042R	PF 0.0068UF-KEB50V
CK46	0880044R	PF 0.01UF-KEB 50V
CK47	0880044R	PF 0.01UF-KEB 50V
CK51	0800321R	EL 47UF-M 50V
CK52	0800321R	EL 47UF-M 50V
CK53	0800321R	EL 47UF-M 50V
CK54	0800321R	EL 47UF-M 50V
CK55	0800321R	EL 47UF-M 50V
CK56	0800321R	EL 47UF-M 50V
CM01	0800023R	EL 22UF-M 16V
CM02	0244171R	CD 0.01UF-Z F 50V TAPE
CM03	0800003R	EL 1.0UF-M 50V
CM04	0244171R	CD 0.01UF-Z F 50V TAPE
CM05	0244171R	CD 0.01UF-Z F 50V TAPE
CM06	0880057R	PF 0.1UF-KEB 50V
CN01	0800279R	EL 1.0UF-M(SMG) 50V
CN02	0800288R	EL 4.7UF-M(SMG) 50V
CN03	0880051R	PF 0.033UF-KEB 50V
CN04	0890084R	CD 560PF-K 50V
CN05	0800041R	EL 47UF-M 16V
CN06	0800018R	EL 10UF-M 50V
CX01	0800041R	EL 47UF-M 16V
CX02	0890065R	CD 22PF-J 50V
CX03	0890061R	CD 10PF- 50V
CX04	0890064R	CD 18PF-J SL 50V
CX05	0800049R	EL 100UF-M 16V
CX06	0800009R	EL 4.7UF-M 25V
CX07	0880031R	PF 1000PF-K 50V
CX08	0890071R	CD 56PF-J 50V
CX09	0880044R	PF 0.01UF-KEB 50V
CX10	0800005R	EL 2.2UF-M 50V
CX11	0800009R	EL 4.7UF-M 25V
CX12	0244171R	CD 0.01UF-Z F 50V TAPE
CX13	0246443R	CD 13PF (C) 50WV
CX14	0880044R	PF 0.01UF-KEB 50V
CX15	0284621R	EL 0.47UF 50V (BP)
CX16	0890089R	CD 1500PF-K 50V
CX17	0890082R	CD 390PF-K 50V
CX18	0890074R	CD 100PF-J 50V
CX19	0890087R	CD 1000PF-K 50V
CX20	0800009R	EL 4.7UF-M 25V
CX21	0890109R	CD T6R0D50D3
CX22	0244171R	CD 0.01UF-Z F 50V TAPE
CX23	0800048R	EL 100UF-M 10V
CX24	0244171R	CD 0.01UF-Z F 50V TAPE
CX25	0244171R	CD 0.01UF-Z F 50V TAPE
CX26	0244171R	CD 0.01UF-Z F 50V TAPE
CX27	0800009R	EL 4.7UF-M 25V
CX28	0244171R	CD 0.01UF-Z F 50V TAPE
CX29	0880053R	PF 0.047UF-KEB 50V
CX30	0244171R	CD 0.01UF-Z F 50V TAPE
CX31	0248690R	CD 180PF-J SL 50V
CX32	0880044R	PF 0.01UF-KEB 50V
CX33	0244171R	CD 0.01UF-Z F 50V TAPE
CX34	0800048R	EL 100UF-M 10V
CX35	0880044R	PF 0.01UF-KEB 50V
CX36	0800048R	EL 100UF-M 10V
CX37	0244171R	CD 0.01UF-Z F 50V TAPE
CX38	0244171R	CD 0.01UF-Z F 50V TAPE
CX39	0244171R	CD 0.01UF-Z F 50V TAPE
CX40	0244171R	CD 0.01UF-Z F 50V TAPE
CX41	0244171R	CD 0.01UF-Z F 50V TAPE
CX42	0800057R	EL 220UF-M 10V
CX45	0800015R	EL 10UF-M 16V
CX46	0800049R	EL 100UF-M 16V
CX47	0800049R	EL 100UF-M 16V
CX48	0880044R	PF 0.01UF-KEB 50V
CX49	0800049R	EL 100UF-M 16V
CX50	0800048R	EL 100UF-M 10V
CX52	0800048R	EL 100UF-M 10V
CX53	0880044R	PF 0.01UF-KEB 50V
CX54	0284647R	EL 22UF-SME(BP) 16V
CY01	0284647R	EL 22UF-SME(BP) 16V
CY04	0800023R	EL 22UF-M 16V
CY05	0800023R	EL 22UF-M 16V
CY06	0800023R	EL 22UF-M 16V
CY07	0800023R	EL 22UF-M 16V
CY08	0800049R	EL 100UF-M 16V
CY09	0276717R	PF 0.1UF-J 50V (TF TYP E)
CY10	0284638R	EL 10UF-SME(BP) 16V
CY14	0800074N	EL 470UF-M 16V
CY17	0800041R	EL 47UF-M 16V
CY50	0800049R	EL 100UF-M 16V
CY51	0284634R	EL 4.7UF-M 50V
CY52	0880011R	EL 0.015UF
CY53	0800015R	EL 10UF-M 16V
CY54	0880013R	EL 0.033UF
CY55	0880006R	EL 0.033UF
CY56	0880006R	EL 0.033UF
CY57	0880016R	PF FILM 0.1UF 50V
CY75	0800023R	EL 22UF-M 16V
CZ01	0800015R	EL 10UF-M 16V
CZ02	0800015R	EL 10UF-M 16V
CZ03	0800049R	EL 100UF-M 16V
CZ04	0800049R	EL 100UF-M 16V
CZ05	0276717R	PF 0.1UF-J 50V (TF TYPE)

REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characters important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	PART DESCRIPTION
CZ06	0880051R	PF 0.033UF-KEB 50V
CZ07	0880041R	PF 0.0056UF-KEB 50V
CZ08	0880041R	PF 0.0056UF-KEB 50V
CZ09	0880051R	PF 0.033UF-KEB 50V
CZ10	0890087R	CD 1000PF-K 50V
CZ11	0800015R	EL 10UF-M 16V
CZ12	0890087R	CD 1000PF-K 50V
CZ13	0800015R	EL 10UF-M 16V
CZ14	0800353R	EL 470UF-M 16V
C002	0890078R	CD 220PF-K 50V
C003	0246464R	CD 100PF-J CH 50V TAPE
C004	0800023R	EL 22UF-M 16V
C005	0890087R	CD 1000PF-K 50V
C006	0284623R	EL 1UF-SME(BP) 50V
C007	0284623R	EL 1UF-SME(BP) 50V
C008	0284623R	EL 1UF-SME(BP) 50V
C009	0284623R	EL 1UF-SME(BP) 50V
C010	0284623R	EL 1UF-SME(BP) 50V
C011	0800003R	EL 1.0UF-M 50V
C012	0800003R	EL 1.0UF-M 50V
C013	0284623R	EL 1UF-SME(BP) 50V
C014	0800003R	EL 1.0UF-M 50V
C015	0800015R	EL 10UF-M 16V
C016	0890121R	CD 33PF-J CH 50V
C017	0890121R	CD 33PF-J CH 50V
C018	0800015R	EL 10UF-M 16V
C019	0800005R	EL 2.2UF-M 50V
C022	0800015R	EL 10UF-M 16V
C023	0800047R	EL 100UF-M 6.3V
C024	0880057R	PF 0.1UF-KEB 50V
C025	0880044R	PF 0.01UF-KEB 50V
C026	0880057R	PF 0.1UF-KEB 50V
C028	0800012R	EL 4.7UF-M 50V
C029	0890074R	CD 100PF-J 50V
C031	0800003R	EL 1.0UF-M 50V
C032	0800047R	EL 100UF-M 6.3V
C033	0880057R	PF 0.1UF-KEB 50V
C034	0890085R	CD 680PF-K 50V
C035	0800015R	EL 10UF-M 16V
C036	0800047R	EL 100UF-M 6.3V
C037	0880057R	PF 0.1UF-KEB 50V
C038	0800048R	EL 100UF-M 10V
C039	0800015R	EL 10UF-M 16V
C040	0800074N	EL 470UF-M 16V
C041	0880057R	PF 0.1UF-KEB 50V
C042	0800003R	EL 1.0UF-M 50V
C043	0800047R	EL 100UF-M 6.3V
C044	0880057R	PF 0.1UF-KEB 50V
C045	0880057R	PF 0.1UF-KEB 50V
C046	0880048R	PF 0.022UF-KEB 50V
C052	0880044R	PF 0.01UF-KEB 50V
C053	0880057R	PF 0.1UF-KEB 50V
C054	0800049R	EL 100UF-M 16V
C056	0800005R	EL 2.2UF-M 50V
C057	0800003R	EL 1.0UF-M 50V
C058	0880057R	PF 0.1UF-KEB 50V
C059	0800049R	EL 100UF-M 16V
C061	0880057R	PF 0.1UF-KEB 50V
C070	0800015R	EL 10UF-M 16V
C101	0800049R	EL 100UF-M 16V
C102	0800049R	EL 100UF-M 16V
C103	0880057R	PF 0.1UF-KEB 50V
C104	0800079N	EL 102M6R3WHLT-SME
C105	0800082N	EL 1000UF-MB16V(SME)
C106	0800079N	EL 102M6R3WHLT-SME
C107	0880057R	PF 0.1UF-KEB 50V
C108	0800082N	EL 1000UF-MB16V(SME)
C109	0800082N	EL 1000UF-MB16V(SME)
C110	0800015R	EL 10UF-M 16V
C111	0800049R	EL 100UF-M 16V
C3A2	0880057R	PF 0.1UF-KEB 50V
C304	0800015R	EL 10UF-M 16V
C305	0800007R	EL 3.3UF-M 50V
C306	0244171R	CD 0.01UF-Z F 50V TAPE
C307	0244171R	CD 0.01UF-Z F 50V TAPE
C308	0244171R	CD 0.01UF-Z F 50V TAPE
C309	0800015R	EL 10UF-M 16V
C311	0880033R	PF 0.0015UF-KEB50V
C312	0880046R	PF 0.015UF-K 50V
C313	0800003R	EL 1.0UF-M 50V
C314	0800003R	EL 1.0UF-M 50V
C315	0800049R	EL 100UF-M 16V
C316	0244171R	CD 0.01UF-Z F 50V TAPE
C317	0800058R	EL 220UF-M 16V
C318	0800003R	EL 1.0UF-M 50V
C319	0244171R	CD 0.01UF-Z F 50V TAPE
C320	0244171R	CD 0.01UF-Z F 50V TAPE
C321	0244171R	CD 0.01UF-Z F 50V TAPE
C322	0244171R	CD 0.01UF-Z F 50V TAPE
C323	0800003R	EL 1.0UF-M 50V
C324	0284623R	EL 1UF-SME(BP) 50V
C325	0800005R	EL 2.2UF-M 50V
C326	0284623R	EL 1UF-SME(BP) 50V
C327	0800003R	EL 1.0UF-M 50V
C328	0880037R	PF 0.0033UF-KEB50V
C329	0890079R	CD 270PF-K 50V
C401	0800015R	EL 10UF-M 16V
C402	0284623R	EL 1UF-SME(BP) 50V
C403	0284623R	EL 1UF-SME(BP) 50V
C404	0800003R	EL 1.0UF-M 50V
C405	0800003R	EL 1.0UF-M 50V
C406	0890087R	CD 1000PF-K 50V
C407	0890087R	CD 1000PF-K 50V
C408	0800042R	EL 47UF-M 25V
C409	0800042R	EL 47UF-M 25V
C410	0800051R	EL 100UF-M 25V
C411	0800003R	EL 1.0UF-M 50V
C412	0800003R	EL 1.0UF-M 50V
C413	0800051R	EL 100UF-M 25V
C414	0800041R	EL 47UF-M 16V
C415	0880057R	PF 0.1UF-KEB 50V
C416	0253934F	EL 2200UF-M 35V
C417	0880057R	PF 0.1UF-KEB 50V
C418	0880057R	PF 0.1UF-KEB 50V
C419	0253934F	EL 2200UF-M 35V
C420	0253934F	EL 2200UF-M 35V
C421	0880062R	PF 0.22UF-KEB 50V
C424	0880057R	PF 0.1UF-KEB 50V
C426	0880044R	PF 0.01UF-KEB 50V
C427	0880044R	PF 0.01UF-KEB 50V
C428	0880057R	PF 0.1UF-KEB 50V
C429	0800015R	EL 10UF-M 16V
C5A8	0800075F	EL 470UF-M 25V
C5A9	0880057R	PF 0.1UF-KEB 50V
C5C1	0880057R	PF 0.1UF-KEB 50V
C5C2	0800049R	EL 100UF-M 16V
C5C3	0880057R	PF 0.1UF-KEB 50V
C5C4	0800075F	EL 470UF-M 25V

REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characters important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	PART DESCRIPTION
C5C5	0880057R	PF 0.1UF-KEB 50V
C5C6	0880057R	PF 0.1UF-KEB 50V
C5C7	0800075F	EL 470UF-M 25V
C5C8	0880057R	PF 0.1UF-KEB 50V
C5E3	0890071R	CD 56PF-J 50V
C5E5	0880044R	PF 0.01UF-KEB 50V
C5E6	0880044R	PF 0.01UF-KEB 50V
C5E7	0800049R	EL 100UF-M 16V
C501	0244171R	CD 0.01UF-Z F 50V TAPE
C502	0800058R	EL 220UF-M 16V
C503	0800001R	EL 0.47UF-M 50V (SME)
C504	0244171R	CD 0.01UF-Z F 50V TAPE
C505	0890116R	CD 15PF-J CH 50V
C506	0880044R	PF 0.01UF-KEB 50V
C507	0244171R	CD 0.01UF-Z F 50V TAPE
C508	0244171R	CD 0.01UF-Z F 50V TAPE
C509	0244171R	CD 0.01UF-Z F 50V TAPE
C510	0244171R	CD 0.01UF-Z F 50V TAPE
C511	0244171R	CD 0.01UF-Z F 50V TAPE
C512	0800015R	EL 10UF-M 16V
C513	0244171R	CD 0.01UF-Z F 50V TAPE
C516	0800041R	EL 47UF-M 16V
C517	0800048R	EL 100UF-M 10V
C518	0800015R	EL 10UF-M 16V
C530	0800049R	EL 100UF-M 16V
C531	0276717R	PF 0.1UF-J 50V (TF TYP E)
C532	0800049R	EL 100UF-M 16V
C533	0880016R	PF FILM 0.1UF 50V
C534	0800009R	EL 4.7UF-M 25V
C603	0800345R	EL 330UF-M(SMG 25V)
C604	AN00062R	PF 103UF 50V
C606	0298261R	TA 1MF-J 35V
C607	0284446R	EL1UF-M 50V
C608	0800368F	EL 2200UF-M 25V
C609	0800347N	EL330UF-M(SMG) 50V
C610	0800326R	EL100UF-M 16V
C611	0800347N	EL330UF-M(SMG) 50V
C612	0880051R	PF 0.033UF-KEB 50V
C613	AN00062R	PF 103UF 50V
C614	0279859F	PF 0.1UF-K 100V
C617	0284446R	EL1UF-M 50V
C618	0284449R	EL4.7UF-KMF 50V
C619	AN00062R	PFD 103UF 50V
C620	0800291R	EL10UF-M(SMG) 16V
C622	0800041R	EL 47UF-M 16V
C623	0800041R	EL 47UF-M 16V
C624	0244109R	CD 4700PF-KB 50V
C701	AN00062R	PF 103UF 50V
C702	0243507R	CD 330PF-K 500V TAPE
C703	0244501R	CD 1000PF-K 500V
C704	0259153F	EL 220UF (HR) 160V
C705	0299926F	PF 0.1UF-K 200V
C706	0890028M	CD 330PF-K B 50V
⚠C708	0262414F	PP 3300PF 1800V
⚠C709	0262426F	PF 0.0091UF 1.8KV
C710	0299931F	PP 0.27UF-K 200V
C711	0299931F	PP 0.27UF-K 200V
⚠C715	0299720F	PP 0.015UF-J 6
C717	0259471	PP 6.8UF-M (BP) 50V
C718	0299636F	PF 0.068UF-J 1600V
C720	0243503R	CD 150PF-K B 500V
C721	0253983F	EL 33UF-M 350V
C722	0800329R	EL100UF-M(SMG) 50V
C723	0880057R	PF 0.1UF-KEB 50V
C724	0890087R	CD 1000PF-K 50V
C725	0800279R	EL 1.0UF-M(SMG) 50V
C726	0244109R	CD 4700PF-KB 50V
C727	0880048R	PF 0.022UF-KEB 50V
C728	0890089R	CD 1500PF-K 50V
C729	0800282R	EL 2.2UF-M(SMG) 50V
C730	0284634R	EL 4.7UF-M 50V
C731	0244501R	CD 1000PF-K 500V
C732	0243508R	CD 390PF-K 500V
C735	0243511R	CD 680PF-K 500V TAPE
C738	0243503R	CD 150PF-K B 500V
C739	0243511R	CD 680PF-K 500V TAPE
C740	0890084R	CD 560PF-K 50V
⚠C741	0246348	CD 220PF-2KV
C804	0244889	CD 2200PF +-10% 2KV
C805	0800326	EL 100MF 16V
C807	0244139	CD 1000PF +-10% 50V
C808	0244139	CD 1000PF +-10% 50V
C810	0800326	EL 100MF 16V
C831	0257543	EL 3.3MF 315V
C834	0244889	CD 2200PF +-10% 2KV
C835	0800326	EL 100MF 16V
C837	0244139	CD 1000PF +-10% 50V
C838	0244139	CD 1000PF +-10% 50V
C864	0244889	CD 2200PF +-10% 2KV
C865	0800326	EL 100MF 16V
C867	0244139	CD 1000PF +-10% 50V
C868	0890086	CD 820PF +-10% 50V
⚠C901	AN00148S	PF 0.22UF250V
⚠C902	AN00144S	PF 0.1UF250V
C904	0248593F	CD 4700PF-Z 250V
C906	0248593F	CD 4700PF-Z 250V
C907	0259167	EL 820UF (HR) 200V
C908	0259167	EL 820UF (HR) 200V
C911	0890087R	CD 1000PF-K 50V
C912	0800059R	EL 220UF-M 25V
C913	0299981F	PF 0.01UF-J 630V
C914	0880044R	PF 0.01UF-KEB 50V
C915	0880037R	PF 0.0033UF-KEB50V
C916	0880031R	PF.1000PF-K 50V
C917	0800286R	EL 4.7UF-M(SMG) 25V
C918	0880057R	PF 0.1UF-KEB 50V
C920	0285221	EL 1000UF-M 35V
C921	0285221	EL 1000UF-M 35V
C922	0285221	EL 1000UF-M 35V
C924	0285224	EL 2200UF-M 25V
C925	0285224	EL 2200UF-M 25V
C926	0258697	EL 470UF (HR) 160V
C927	0880044R	PF 0.01UF-KEB 50V
C928	0244105R	CD 2200PF-K 50V TAPE
C930	0284436R	EL 100UF-M 35V
C931	0284436R	EL 100UF-M 35V
C933	0800326R	EL100UF-M 16V
C935	0284436R	EL 100UF-M 35V
C936	0284405R	EL 220UF-M 16V
C937	0284405R	EL 220UF-M 16V
C939	0284436R	EL 100UF-M 35V
C942	0800326R	EL100UF-M 16V
C943	0800279R	EL 1.0UF-M(SMG) 50V
C944	0800317R	EL47UF-M(SMG) 16V
C945	0284647R	EL 22UF-SME(BP) 16V
C947	0258121R	EL 2.2UF-M 100V
C954	0800363F	EL SMG1000UF-M 35V
C955	0800317R	EL 47UF-M(SMG) 16V

REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characters important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	PART DESCRIPTION
C956	0800082F	EL 1000UF-M 16V
C957	0800331R	EL 100UF-M 63V
C958	0800331R	EL 100UF-M 63V
C960	0880057R	PF 0.1UF-KEB 50V
C967	0880198R	PF 0.22UF-J 50V
C968	0880198R	PF 0.22UF-J 50V
C969	0880198R	PF 0.22UF-J 50V
C972	0800291R	EL10UF-M(SMG) 16V
C973	0800083F	EL1000UF-M 25V
C974	0800326	EL100UF-M 16V
		DIODES
DA01	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DA02	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DA03	2348031M	DI MTZ-J2.7ATA
DA04	2348031M	DI MTZ-J2.7ATA
DA05	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DA06	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DA07	2348031M	DI MTZ-J2.7ATA
DA08	2348031M	DI MTZ-J2.7ATA
DA11	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DA12	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DE01	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DE02	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DE03	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DE04	CH00151M	DI DSM1SD2(200V)TAPE
DE05	CH00151M	DI DSM1SD2(200V)TAPE
DE06	CH00151M	DI DSM1SD2(200V)TAPE
DE07	CH00151M	DI DSM1SD2(200V)TAPE
DF01	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DF02	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DF03	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DF04	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DF05	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DF06	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DK03	2339551M	DI ED14(V1) SI 5MA 45
DK04	CH00172M	DI DFM1SD2(200V)TAPE
DK05	CH00172M	DI DFM1SD2(200V)TAPE
DK06	2334324M	ZD RD36E TAPE (B3) SI 500MW
DK07	2334324M	ZD RD36E TAPE (B3) SI 500MW
DK08	2334324M	ZD RD36E TAPE (B3) SI 500MW
DK09	2334324M	ZD RD36E TAPE (B3) SI 500MW
DK10	2334324M	ZD RD36E TAPE (B3) SI 500MW
DK11	2334324M	ZD RD36E TAPE (B3) SI 500MW
DK12	2334324M	ZD RD36E TAPE (B3) SI 500MW
DK13	2334324M	ZD RD36E TAPE (B3) SI 500MW
DK14	2334324M	ZD RD36E TAPE (B3) SI 500MW
DK15	2334324M	ZD RD36E TAPE (B3) SI 500MW
DK16	2334324M	ZD RD36E TAPE (B3) SI 500MW
DK17	2334324M	ZD RD36E TAPE (B3) SI 500MW
DK18	2331797M	ZD HZ-5 (C1)
DK19	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DK23	2331154M	ZD HZ-12 (A1-3 B1-3.TA) SI 200MA
DK24	2331154M	ZD HZ-12 (A1-3 B1-3.TA) SI 200MA
DK25	2331154M	ZD HZ-12 (A1-3 B1-3.TA) SI 200MA
DK26	2331154M	ZD HZ-12 (A1-3 B1-3.TA) SI 200MA
DK27	2331154M	ZD HZ-12 (A1-3 B1-3.TA) SI 200MA
DK28	2331154M	ZD HZ-12 (A1-3 B1-3.TA) SI 200MA
DK32	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DK39	2339551M	DI ED14(V1) SI 5MA 45
DK40	2331154M	ZD HZ-12 (A1-3 B1-3.TA) SI 200MA
DK50	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DM01	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DM02	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DM03	CH00231	LED SLH-56VC3F
DM04	2348212M	DI MTZ-J15BTA
DN01	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DN02	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DN03	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DN04	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DN05	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DN06	2348071M	ZD MTZJ-3.9A TA
DN07	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DN08	CH00151M	DI DSM1SD2(200V)TAPE
DN09	2331849M	ZD HZ12C3 (TA) SI 500MW
DN10	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DX01	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DY50	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
DZ01	CH00151M	DI DSM1SD2 (200V)
D005	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D012	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D013	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D014	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D015	2331827M	ZD HZ-9 TAPE (C1) SI 500MW
D022	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D023	2348103M	ZD MTZJ-5.1C TA
D024	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D025	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D026	2348212M	DI MTZ-J15BTA
D027	2348212M	DI MTZ-J15BTA
D028	2348212M	DI MTZ-J15BTA
D029	2348212M	DI MTZ-J15BTA
D030	2348212M	DI MTZ-J15BTA
D031	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D033	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D034	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D040	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D041	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D042	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D043	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D044	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D101	2348212M	DI MTZ-J15BTA
D103	2335991M	ZD HZ-T33 (02 TP)
D104	2348123M	ZD MTZJ-6.2C TA
D105	2335991M	ZD HZ-T33 (02 TP)
D106	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D107	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D3A1	2334324M	ZD RD36E TAPE (B3) SI 500MW
D301	2339867M	ZD HZS-9-C1 TAPE (SI.200MA)
D302	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D303	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D304	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D305	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D306	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D307	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D308	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D309	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D310	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D311	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D313	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D314	2348103M	ZD MTZJ-5.1C TA
D401	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D402	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D404	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D405	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D406	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D407	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC

REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characters important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	PART DESCRIPTION
D5A3	CH00151M	DI DSM1SD2(200V)TAPE
D5A5	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D5A6	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D502	2331827M	ZD HZ-9 TAPE (C1) SI 500MW
D503	2331827M	ZD HZ-9 TAPE (C1) SI 500MW
D504	2331827M	ZD HZ-9 TAPE (C1) SI 500MW
D505	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D506	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D507	2348103M	ZD MTZJ-5.1C TA
D508	2331827M	ZD HZ-9 TAPE (C1) SI 500MW
D509	2348103M	ZD MTZJ-5.1C TA
D601	2334243M	ZD RD16E (B2 T2/TP/TA) SI 10MA 1
D602	2331154M	ZD HZ-12 (A1-3 B1-3.TA) SI 200MA
D603	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D604	2331807M	ZD HZ-6 TAPE (C1) SI 500MW
D605	CH00151M	DI DSM1SD2(200V)TAPE
D606	CH00151M	DI DSM1SD2(200V)TAPE
D607	CH00151M	DI DSM1SD2(200V)TAPE
D608	CH00031M	DI AU02V1(280V)
D609	2334305M	ZD RD30E (B4 T2/TP/TA) SI 5MA 30
D610	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D611	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D612	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D614	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D615	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D616	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D620	CH00151M	DI DSM1SD2(200V)TAPE
D622	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D701	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
⚠D702	2348511	DI RS3FS
⚠D703	2359371	DI S3L60 SI
⚠D704	2359371	DI S3L60 SI
D705	CH00041M	DI ES1FV1 (1500V)
D706	CH00041M	DI ES1FV1 (1500V)
⚠D708	CH00031M	DI AU02V1(280V)
⚠D709	CH00031M	DI AU02V1(280V)
⚠D710	2335042M	ZD HZ-22 (2L TP) SI 200MA
D711	2339612M	ZD HZS-3 TA (BLL) SI 200MA
D712	CH00151M	DI DSM1SD2(200V)TAPE
D713	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D714	CH00172M	DI DFM1SD2(200V)TAPE
D715	2348203M	ZD MTZJ-13C TA
D716	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D717	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D718	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D719	CH00172M	DI DFM1SD2(200V)TAPE
D801	2331827	ZD HZ-9 (C1)
D802	23383211	DI 1SS270
D805	23383211	DI 1SS270
D831	2331827	ZD HZ-9 (C1)
D832	23383211	DI 1SS270
D833	23383211	DI 1SS270
D834	2331827	ZD HZ-9 (C1)
D861	2331827	ZD HZ-9 (C1)
D862	23383211	DI 1SS270
D863	23383211	DI 1SS270
D864	2331827	ZD HZ-9 (C1)
⚠D901	2342061	DI D3SB(A)60.
D902	CH00172M	DI DFM1SD2(200V)TAPE
D903	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D904	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D905	CH00172M	DI DFM1SD2(200V)TAPE
D906	2334304M	ZD RD30E (B3 T2/TP/TA) SI 5MA 3
D907	2331827M	ZD HZ-9 TAPE (C1)SI 500MW
D909	CH00151M	DI DSM1SD2(200V)TAPE
D912	2348202M	ZD MTZJ-13B TA
D913	2359401	DI FMP-G12S
D914	2359401	DI FMP-G12S
D915	2359401	DI FMP-G12S
D916	2349861	DI FMU-G16S
D917	2359401	DI FMP-G12S
D918	2359401	DI FMP-G12S
D920	CH00151M	DI DSM1SD2(200V)TAPE
D921	2339222M	ZD HZS27-2L
D922	2348283M	ZD MTZJ-30C TA
D923	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D924	2348141M	ZD MTZJ-7.5A TA
D925	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D926	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D927	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D928	2348213M	ZD MTZJ-15C TA
D930	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D931	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
⚠D932	2348283M	ZD MTZJ-30C TA
D933	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
⚠D934	2339042M	ZD HZS7A2L TAPE
D935	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D936	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D937	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D938	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D939	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D940	2348304M	ZD MTZJ-36D TA
D941	CH00172M	DI DFM1SD2(200V)TAPE
D942	CH00172M	DI DFM1SD2(200V)TAPE
D943	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D944	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D945	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D946	CH00151M	DI DSM1SD2(200V)TAPE
D947	CH00151M	DI DSM1SD2(200V)TAPE
D948	CH00151M	DI DSM1SD2(200V)TAPE
D949	CH00151M	DI DSM1SD2(200V)TAPE
D950	CH00182R	DI (SLZ-381C-06-T1)
D951	CH00182R	DI (SLZ-381C-06-T1)
D952	CH00182R	DI (SLZ-381C-06-T1)
D953	CH00182R	DI (SLZ-381C-06-T1)
D954	CH00182R	SLZ-381C-06-T1)
D955	2331785M	ZD HZ-4 TAPE (B2) SI 500MW
D956	2348313M	ZD MTZJ-39C TA
D957	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D958	2398611M	DI 1SS254 TAPE (35V) I 4NSEC
D959	CH00172M	DI DFM1SD2(200V)TAPE
D968	2348213M	ZD MTZJ-15C TA
D970	2348193M	ZD MTZJ-12C TA
D971	2348213M	ZD MTZJ-15C TA
D972	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D973	2331785M	ZD HZ-4 TAPE (B2) SI 500MW
D974	2334304M	ZD RD30E (B3 T2/TP/TA) SI 5MA 3
D975	CH00183R	DI (SLZ-981C-06-T1)
D976	2348141M	ZD MTZJ-7.5A TA
D977	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D978	2348264M	ZD MTZJ-24D TA
D979	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D980	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC
D981	2398611M	DI 1SS254 TAPE (35V) SI 4NSEC

REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characters important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	PART DESCRIPTION
		FUSES
⚠F902	2722358	FUSE AC 5A
⚠F903	FN00071R	FUSE DC 5A UL
⚠F905	2722389M	FUSE DC 4A
⚠F906	2722353	FUSE AC 1.6A
		COMPOUND COMPONENTS
⚠EFPK	AZ00003	CRX FOCUS PACK
HM01	2574762	R/C MODULE SPS-409-1K
H001	2791754R	CONDENSER WITH 3 TERMINAL 100PF
H002	2791754R	CONDENSER WITH 3 TERMINAL 100PF
H003	2791754R	CONDENSER WITH 3 TERMINAL 100PF
H004	2791754R	CONDENSER WITH 3 TERMINAL 100PF
H005	2791754R	CONDENSER WITH 3 TERMINAL 100PF
H006	2791754R	CONDENSER WITH 3 TERMINAL 100PF
⚠H901	2793312	CP-EXN-471P365L
H902	2793312	CP-EXN-471P365L
UKDG	CS00021	DIGI-CON.HC2061 ASY
U002	HP00091	PINP UNIT KC-010S
U101	HC00221	BTF-WB451
U102	2429691	FE TUNER V8-A68FT
		IC'S
IA02	2366301	IC UPD4052BC
IA03	CP02601	AN5285K
IK02	2003421	IC UPC7805AHF
IK04	2003191	IC STK4274
IK05	2003191	IC STK4274
IK06	2003191	IC STK4274
IK07	2380391	IC UPD6326C
IK08	CP01631R	ICL-PST9142
IX01	CP01081U	DIGITAL MONOLITHIC IC (TC9089AN)
IX02	CP00121U	ANALOG MONOLITHIC IC (MM1093N)
IY01	2020452	ANALOG MONOLITHIC IC (CXA1545AS)
IZ01	2020001	IC TDA9860
I001	CP02794	MN1876476-HHW
I002	CP00822	DIGITAL MONOLITHIC IC M6M80042P
I003	2366301	IC UPD4052BC
I004	CP00822	DIGITAL MONOLITHIC IC M6M80042P
I006	CP00761	ANALOG MONOLITHIC IC (MM1231XD)
I007	2000541	IC M51951BSL
I401	2004751	IC TA8200AH
I5A2	2003421	IC UPC7805AHF
I5A3	2003421	IC UPC7805AHF
I5A4	2004665	IC PQ09RF21
I501	2020324	ANALOG MONOLITHIC IC (YAT016H)
I502	CP02781	M62399P
I601	2003541	IC LA7838
⚠I901	2373343	IC M6511
⚠I902	2000465	IC PS2501-1 (KC/LC)
⚠I903	2000465	IC PS2501-1 (KC/LC)
⚠I904	2381343	IC (SE115N)
I906	CP03163	ANALOG MONOLITHIC UPC7912AHF
I907	2003424	IC UPC7812AHF
		COILS
LA02	2123763R	RADIAL COIL 101K(TYPE EL0405)
LA03	2123763R	RADIAL COIL 101K(TYPE EL0405)
LE01	2123103M	COIL-AXIAL LAL 10UH-K
LE02	2123468M	FERRITE BEADS CORE LEAD 0.8MH
LE03	2123468M	FERRITE BEADS CORE LEAD 0.8MH
LE04	2123468M	FERRITE BEADS CORE LEAD 0.8MH
LK01	2123462M	FERRITE BEADS CORE B 2.3UH
LK02	2123462M	FERRITE BEADS CORE B 2.3UH
LK03	BH00214R	FILTER COIL 100UH
LK04	2122929M	COIL-AXIAL 1.0UH-M
LK05	2122929M	COIL-AXIAL 1.0UH-M
LK06	2122929M	COIL-AXIAL 1.0UH-M
LK07	2122929M	COIL-AXIAL 1.0UH-M
LK08	2122929M	COIL-AXIAL 1.0UH-M
LK09	2122929M	COIL-AXIAL 1.0UH-M
LK10	2122929M	COIL-AXIAL 1.0UH-M
LK11	2122929M	COIL-AXIAL 1.0UH-M
LX01	2123105M	LAL02 AXIAL COIL 15UH-K
LX02	2123116M	COIL-AXIAL 100UH-K
LX03	2123109M	COIL-AXIAL 33UH-K
LX04	2123763R	RADIAL COIL 101K(TYPE EL0405)
LX05	2123763R	RADIAL COIL 101K(TYPE EL0405)
LX06	2123763R	RADIAL COIL 101K(TYPE EL0405)
LX07	2123763R	RADIAL COIL 101K(TYPE EL0405)
LX08	2123763R	RADIAL COIL 101K(TYPE EL0405)
LX09	2123763R	RADIAL COIL 101K(TYPE EL0405)
LX10	2123763R	RADIAL COIL 101K(TYPE EL0405)
LX11	2123109M	COIL-AXIAL 33UH-K
LY01	2123781R	FILTER COIL 101K
LY04	2123763R	RADIAL COIL 101K(TYPE EL0405)
LY50	2123116M	COIL-AXIAL 100UH-K
LZ01	2123781R	FILTER COIL 101K
L002	2123781R	FILTER COIL 101K
L003	2123781R	FILTER COIL 101K
L004	2146093	COIL (LC FILTER) FL-160V5R8SS
L101	2123763R	RADIAL COIL 101K(TYPE EL0405)
L102	2123763R	RADIAL COIL 101K(TYPE EL0405)
L103	2123781R	FILTER COIL 101K
L104	2123763R	RADIAL COIL 101K(TYPE EL0405)
L105	2123781R	FILTER COIL 101K
L106	2123781R	FILTER COIL 101K
L107	2123781R	FILTER COIL 101K
L303	2123763R	RADIAL COIL 101K(TYPE EL0405)
L401	2122652M	FERRITE CORE
L5A6	2122952M	COIL-AXIAL 47UHKM BELTING
L5A7	2123763R	RADIAL COIL 101K(TYPE EL0405)
L504	2123763R	RADIAL COIL 101K(TYPE EL0405)
L601	2123461M	FERRITE BEADS B 0.8 MH
L701	BH00212R	FILTER COIL 68UH
L702	2123461M	FERRITE BEADS B 0.8 MH
L703	2123465M	FERRITE BEADS 0.4UH
L704	2123461M	FERRITE BEADS B 0.8 MH
L705	BZ00846	CHOKE COIL 1000UH SL1720
L706	BH00228R	COIL 332K-1T7608A
L707	BH00206R	FILTER COIL 27UH
L708	BH00214R	FILTER COIL 100UH
L709	BH00202R	FILTER COIL 12UH
L710	BZ00318	LINEARITY COIL 50UH-W
L711	BZ00317	LINEARITY COIL 140UH-W
L803	2123763	RADIAL COIL 100MH
⚠L901	BZ00571	LINE FILTER 1.0MH
⚠L902	BZ00561	LINE FILTER 3.9MH
⚠L903	BZ00571	LINE FILTER 1.0MH
L904	2122653M	FERRITE CORE 1.65UH TAPE
L907	BH00201R	FILTER COIL 10UH
L908	BH00201R	FILTER COIL 10UH
L909	BH00201R	FILTER COIL 10UH
L912	BH00201R	FILTER COIL 10UH

REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characters important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	PART DESCRIPTION
L913	BH00201R	FILTER COIL 10UH
L916	BH00214R	FILTER COIL 100UH
L917	BH00214R	FILTER COIL 100UH
L918	BH00214R	FILTER COIL 100UH
L923	BH00212R	FILTER COIL 68UH
L924	BH00214R	FILTER COIL 100UH
L925	BH00214R	FILTER COIL 100UH
L926	2161152	FILTER COIL
		TRANSISTORS
QA01	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QA02	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
QA03	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QA04	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
QA05	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QA06	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QA07	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QA09	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QA11	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QA12	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QA72	2326876R	TRS. DTC124ES TAPE
QA73	2326876R	TRS. DTC124ES TAPE
QA74	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QA75	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QA78	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
QA79	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
QC01	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QE01	2320598M	TRS. 2SC458 (B TZ/C TZ/D TZ)
QE02	2320598M	TRS. 2SC458 (B TZ/C TZ/D TZ)
QE03	2320598M	TRS. 2SC458 (B TZ/C TZ/D TZ)
QE04	2320598M	TRS. 2SC458 (B TZ/C TZ/D TZ)
QE05	2320598M	TRS. 2SC458 (B TZ/C TZ/D TZ)
QE06	2320647M	TRS. 2SC1213 (C 21 TZ/D 21 TZ) SI 80MHZ4
QE07	2321351M	TRS. 2SA836/844D/E 100MA 200MW 200MHZSI
QE08	2315381	TRS. 2SA1837
QE09	2315391	TRS. 2SC4793
QE10	2320598M	TRS. 2SC458 (B TZ/C TZ/D TZ)
⚠QF01	2314991	TRS. 2SC4630
QF02	2320663M	TRS. 2SC1213A (C)
QF03	2320663M	TRS. 2SC1213A (C)
QF04	2320663M	TRS. 2SC1213A (C)
QF05	2320663M	TRS. 2SC1213A (C)
QF06	2320663M	TRS. 2SC1213A (C)
QF07	2320663M	TRS. 2SC1213A (C)
QF08	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QF09	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QF10	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QF11	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QK01	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QK02	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QK03	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QK04	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QK08	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
QK09	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
QK10	2312172	TRS. 2SD2375 Q/P
QM01	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QM02	2312992	PHOTO TRS. RPT-38PT3F (M)
QN01	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QN02	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QN03	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
QN04	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QN05	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QN06	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
QX01	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QX02	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QX04	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QX05	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QX06	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QX07	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
QX08	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QX09	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QX10	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QX11	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
QX12	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QY01	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QY07	2326021M	TRS. 2SC1741S P/R/Q (TP) 250MHZ 30
QY08	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QY50	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
QY51	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QY52	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
QY53	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
QY54	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q001	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q002	2327772M	TRS.2SC3413 TAPE (B/C) SI 200MHZ
Q003	2320647M	TRS. 2SC1213 (C 21 TZ/D 21 TZ) SI 80MHZ4
Q004	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q005	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q006	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
Q007	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q008	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q010	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q011	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q012	2320647M	TRS. 2SC1213 (C 21 TZ/D 21 TZ) SI 80MHZ4
Q013	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q014	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
Q015	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q016	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q017	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q018	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q019	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q021	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q022	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
Q023	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
Q024	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q101	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q102	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q103	2320647M	TRS. 2SC1213 (C 21 TZ/D 21 TZ) SI 80MHZ4
Q105	2323524M	TRS. 2SD789 TAPE(C)
Q3A2	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q3A3	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q302	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q303	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q304	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q305	2326021M	TRS. 2SC1741S P/R/Q (TP) 250MHZ 30
Q310	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q311	2326876R	TRS. DTC124ES TAPE
Q312	2326876R	TRS. DTC124ES TAPE
Q313	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q401	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q402	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q403	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q404	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q5A3	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q5A4	2326876R	TRS. DTC124ES TAPE
Q5A5	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q5A6	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q501	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ

REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characters important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	PART DESCRIPTION
Q502	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q503	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q506	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q601	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q604	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
Q605	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
Q606	2312177	TRS. 2SD2375 (LD) (P)
Q607	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
Q608	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q609	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
Q610	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
Q612	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q613	2320665R	TRS. 2SC1213A(D R) TA
Q701	2326216	TRS. 2SC3116 (S/T)
Q704	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q705	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
Q706	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q707	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
⚠Q777	2315274F	TRS. 2SC4589-05 (1500V)
Q801	2312372F	TRS. 2SC3942
Q802	2320663	TRS. 2SC1213AC SI 80MHZ 400MW
Q803	2320637	TRS. 2SA673C/D SI 80MHZ 400MW
Q804	2320591	TRS. 2SC458B/C SI 230MHZ 200MW
Q831	2312372F	TRS. 2SC3942
Q832	2320663	TRS. 2SC1213AC SI 80MHZ 400MW
Q833	2320637	TRS. 2SA673C/D SI 80MHZ 400MW
Q835	2320591	TRS. 2SC458B/C SI 230MHZ 200MW
Q861	2312372F	TRS. 2SC3942
Q862	2320663	TRS. 2SC1213AC SI 80MHZ 400MW
Q863	2320637	TRS. 2SA673C/D SI 80MHZ 400MW
Q865	2320591	TRS. 2SC458B/C SI 230MHZ 200MW
Q901	2320665R	TRS. 2SC1213A(D R) TA
Q902	2312171	TRS. 2SC3852
⚠Q903	2323782R	THYRISTOR 03P2M(TA)
⚠Q909	2321112M	TRS.2SA778AK(02 TAPE)
Q912	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q913	2320591M	TRS. 2SC458 (B TZ/C TZ) SI 230MHZ
Q914	2320637M	TRS. 2SA673 (C 26TZ/D 26TZ) SI 80MHZ
Q915	2312177	TRS. 2SD2375 (LD) (P)
		RESISTORS
RAC9	0700062M	CF 1/16W 39K-JB
RAD1	0700041M	CF 1/16W 1.0K-JB
RAD2	0700054M	CF 1/16W 10K-JB
RAD3	0700041M	CF 1/16W 1.0K-JB
RAD4	0700062M	CF 1/16W 39K-JB
RAD5	0700041M	CF 1/16W 1.0K-JB
RAD6	0700054M	CF 1/16W 10K-JB
RAD7	0700041M	CF 1/16W 1.0K-JB
RA01	0700051M	CF 1/16W 5.6K-JB
RA02	0700051M	CF 1/16W 5.6K-JB
RA05	0700051M	CF 1/16W 5.6K-JB
RA06	0700051M	CF 1/16W 5.6K-JB
RA07	0700051M	CF 1/16W 5.6K-JB
RA08	0700051M	CF 1/16W 5.6K-JB
RA09	0700041M	CF 1/16W 1.0K-JB
RA10	0700041M	CF 1/16W 1.0K-JB
RA11	0700027M	CF 1/16W 100-JB
RA12	0700027M	CF 1/16W 100-JB
RA18	0700062M	CF 1/16W 39K-JB
RA19	0700054M	CF 1/16W 10K-JB
RA20	0700041M	CF 1/16W 1.0K-JB
RA21	0700041M	CF 1/16W 1.0K-JB
RA22	0700034M	CF 1/16W 330-JB
RA23	0700032M	CF 1/16W 220-JB
RA24	0700062M	CF 1/16W 39K-JB
RA25	0700054M	CF 1/16W 10K-JB
RA26	0700041M	CF 1/16W 1.0K-JB
RA27	0700041M	CF 1/16W 1.0K-JB
RA28	0700034M	CF 1/16W 330-JB
RA29	0700032M	CF 1/16W 220-JB
RA30	0700041M	CF 1/16W 1.0K-JB
RA31	0700067M	CF 1/16W 100K-JB
RA32	0700041M	CF 1/16W 1.0K-JB
RA33	0700067M	CF 1/16W 100K-JB
RA38	0700034M	CF 1/16W 330-JB
RA39	0700032M	CF 1/16W 220-JB
RA44	0700034M	CF 1/16W 330-JB
RA45	0700032M	CF 1/16W 220-JB
RA46	0700041M	CF 1/16W 1.0K-JB
RA47	0700067M	CF 1/16W 100K-JB
RA48	0700041M	CF 1/16W 1.0K-JB
RA49	0700067M	CF 1/16W 100K-JB
RA50	0700041M	CF 1/16W 1.0K-JB
RA51	0700067M	CF 1/16W 100K-JB
RA52	0700041M	CF 1/16W 1.0K-JB
RA53	0700067M	CF 1/16W 100K-JB
RA54	0700041M	CF 1/16W 1.0K-JB
RA55	0700067M	CF 1/16W 100K-JB
RA56	0700041M	CF 1/16W 1.0K-JB
RA57	0700067M	CF 1/16W 100K-JB
RA58	0700041M	CF 1/16W 1.0K-JB
RA59	0700067M	CF 1/16W 100K-JB
RA60	0700041M	CF 1/16W 1.0K-JB
RA61	0700067M	CF 1/16W 100K-JB
RA64	0100123M	CF 1/8W 270K-JB
RA65	0100123M	CF 1/8W 270K-JB
RA66	0100123M	CF 1/8W 270K-JB
RA67	0100123M	CF 1/8W 270K-JB
RA68	0179561M	MG 2.2M-J TAPE
RA69	0700049M	CF 1/16W 4.7K-JB
RA70	0700056M	CF 1/16W 15K-JB
RA83	0700041M	CF 1/16W 1.0K-JB
RA84	0700067M	CF 1/16W 100K-JB
RA85	0700054M	CF 1/16W 10K-JB
RA86	0700041M	CF 1/16W 1.0K-JB
RA89	0700054M	CF 1/16W 10K-JB
RA90	0700054M	CF 1/16W 10K-JB
RA91	0700041M	CF 1/16W 1.0K-JB
RA92	0700067M	CF 1/16W 100K-JB
RA93	0700054M	CF 1/16W 10K-JB
RA94	0700041M	CF 1/16W 1.0K-JB
RC02	0700027M	CF 1/16W 100-JB
RC04	0700027M	CF 1/16W 100-JB
RC05	0700032M	CF 1/16W 220-JB
RC06	0700041M	CF 1/16W 1.0K-JB
RC16	0100038M	CF 1/8W 75-JB
RE01	0110135S	MF 390-JS
RE02	0700067M	CF 1/16W 100K-JB
RE03	0700059M	CF 1/16W 27K-JB
RE04	0700035M	CF 1/16W 390-JB
RE05	0700042M	CF 1/16W 1.2K-JB
RE06	0700036M	CF 1/16W 470-JB
RE07	0700067M	CF 1/16W 100K-JB
RE08	0700059M	CF 1/16W 27K-JB
RE09	0700042M	CF 1/16W 1.2K-JB
RE10	0700033M	CF 1/16W 270-JB

REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characters important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	PART DESCRIPTION
RE11	0700033M	CF 1/16W 270-JB
RE12	0700045M	CF 1/16W 2.2K-JB
RE13	0700058M	CF 1/16W 22K-JB
RE14	0700067M	CF 1/16W 100K-JB
RE15	0700046M	CF 1/16W 2.7K-JB
RE16	0113742M	CF 1/2W 470-JB
RE17	0700061M	CF 1/16W 33K-JB
RE18	0700036M	CF 1/16W 470-JB
RE19	0700067M	CF 1/16W 100K-JB
RE20	0700054M	CF 1/16W 10K-JB
RE21	0100065M	CF 1/8W 1K-JB
RE22	0700025M	CF 1/16W 68-J
RE23	0113701M	CF SRD1/2P-B 10-J
RE24	0100039M	CF 1/8W 82-JB
RE25	0114165M	CF SRD 1/4 PF 1.5K-J
RE26	0114143M	CF 1/4W 330-JB
RE27	0114221M	CF 1/4 PB 68K-J
RE28	0114221M	CF 1/4 PB 68K-J
RE29	0113776M	CF SRD1/2P-B 12K-J
RE30	0100039M	CF 1/8W 82-JB
RE31	0100069M	CF 1/8W 1.5K-JB
RE32	0100053M	CF 1/8W 330-JB
RE33	0113716M	CF SRD1/2P-B 43-J
RE34	0110229S	MF 220-JS
RE35	0113686M	CF 1/2W 2.7-J
RE36	0113686M	CF 1/2W 2.7-J
RE37	0113716M	CF SRD1/2P-B 43-J
RE38	0110132S	MF 300-JS
RE39	0700054M	CF 1/16W 10K-JB
RE40	0700049M	CF 1/16W 4.7K-JB
RF01	0110279S	MF 27K-JS
RF02	0110279S	MF 27K-JS
RF03	0110279S	MF 27K-JS
RF04	0110279S	MF 27K-JS
RF05	0110279S	MF 27K-JS
RF06	0114213M	CF SRD 1/4 PB 33K-J
RF07	0100065M	CF 1/8W 1K-JB
RF08	0100041M	CF 1/8W 100-JB
RF09	0700035M	CF 1/16W 390-JB
RF10	0700045M	CF 1/16W 2.2K-JB
RF11	0700059M	CF 1/16W 27K-JB
RF12	0700059M	CF 1/16W 27K-JB
RF13	0700048M	CF 1/16W 3.9K-JB
RF14	0700041M	CF 1/16W 1.0K-JB
RF15	0700046M	CF 1/16W 2.7K-JB
RF16	0700049M	CF 1/16W 4.7K-JB
RF17	0700027M	CF 1/16W 100-JB
RF18	0700054M	CF 1/16W 10K-JB
RF19	0700037M	CF 1/16W 560-JB
RF20	0700066M	CF 1/16W 82K-JB
RF21	0700049M	CF 1/16W 4.7K-JB
RF22	0700059M	CF 1/16W 27K-JB
RF23	0700043M	CF 1/16W 1.5K-JB
RF24	0700051M	CF 1/16W 5.6K-JB
RF25	0700038M	CF 1/16W 680-JB
RF26	0187098M	CF 1/16W 24K-JB
RF27	0700054M	CF 1/16W 10K-JB
RF28	0100113M	CF 1/8W 100K-JB
RF29	0700063M	CF 1/16W 47K-JB
RF30	0700046M	CF 1/16W 2.7K-JB
RF31	0700041M	CF 1/16W 1.0K-JB
RF32	0700052M	CF 1/16W 6.8K-JB
RF33	0700058M	CF 1/16W 22K-JB
RF34	0700058M	CF 1/16W 22K-JB
RF35	0700056M	CF 1/16W 15K-JB
RF36	0700053M	CF 1/16W 8.2K-JB
RF37	0700041M	CF 1/16W 1.0K-JB
RF38	0700061M	CF 1/16W 33K-JB
RF39	0700049M	CF 1/16W 4.7K-JB
RF40	0700054M	CF 1/16W 10K-JB
RF41	0700054M	CF 1/16W 10K-JB
RKA4	0700052M	CF 1/16W 6.8K-JB
RKA5	0700044M	CF 1/16W 1.8K-JB
RKA6	0700041M	CF 1/16W 1.0K-JB
RKA7	0700041M	CF 1/16W 1.0K-JB
RK01	0700063M	CF 1/16W 47K-JB
RK02	0700049M	CF 1/16W 4.7K-JB
RK03	0100125M	CF 1/8W 330K-JB
RK05	0700054M	CF 1/16W 10K-JB
RK06	0700054M	CF 1/16W 10K-JB
RK07	0700027M	CF 1/16W 100-JB
RK08	0700027M	CF 1/16W 100-JB
RK09	0700027M	CF 1/16W 100-JB
RK10	0700041M	CF 1/16W 1.0K-JB
RK11	0700041M	CF 1/16W 1.0K-JB
RK12	0700041M	CF 1/16W 1.0K-JB
RK13	0700063M	CF 1/16W 47K-JB
RK14	0110229S	MF 220-JS
RK15	0113694M	CF 1/2W 5.6-J
RK16	0113694M	CF 1/2W 5.6-J
RK17	0100077M	CF 1/8W 3.3K-JB
RK18	0700063M	CF 1/16W 47K-JB
RK19	0110225S	MG 150-JS 2W
RK20	0113692M	CF 1/2W 4.7-J
RK21	0113692M	CF 1/2W 4.7-J
RK22	0100077M	CF 1/8W 3.3K-JB
RK23	0700063M	CF 1/16W 47K-JB
RK24	0110229S	MF 220-JS
RK25	0113698M	CF 1/2W 8.2-J
RK26	0113698M	CF 1/2W 8.2-J
RK27	0100077M	CF 1/8W 3.3K-JB
RK28	0700063M	CF 1/16W 47K-JB
RK29	0110225S	MG 150-JS 2W
RK30	0113696M	CF 1/2W 6.8-J
RK31	0113696M	CF 1/2W 6.8-J
RK32	0100077M	CF 1/8W 3.3K-JB
RK33	0700063M	CF 1/16W 47K-JB
RK34	0110229S	MF 220-JS
RK35	0113696M	CF 1/2W 6.8-J
RK36	0113696M	CF 1/2W 6.8-J
RK37	0100077M	CF 1/8W 3.3K-JB
RK38	0100077M	CF 1/8W 3.3K-JB
RK39	0700063M	CF 1/16W 47K-JB
RK40	0110225S	MF 150-JS 2W
RK41	0113692M	CF 1/2W 4.7-J
RK42	0113692M	CF 1/2W 4.7-J
RK53	0700044M	CF 1/16W 1.8K-JB
RK54	0700041M	CF 1/16W 1.0K-JB
RK55	0700041M	CF 1/16W 1.0K-JB
RK56	0700041M	CF 1/16W 1.0K-JB
RK57	0700041M	CF 1/16W 1.0K-JB
RK58	0700041M	CF 1/16W 1.0K-JB
RK59	0700046M	CF 1/16W 2.7K-JB
RK60	0700052M	CF 1/16W 6.8K-JB
RK61	0700046M	CF 1/16W 2.7K-JB
RK62	0700052M	CF 1/16W 6.8K-JB
RK63	0700046M	CF 1/16W 2.7K-JB
RK64	0700052M	CF 1/16W 6.8K-JB

REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characters important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	PART DESCRIPTION
RK65	0700046M	CF 1/16W 2.7K-JB
RK66	0700052M	CF 1/16W 6.8K-JB
RK67	0700036M	CF 1/16W 470-JB
RK68	0700055M	CF 1/16W 12K-JB
RK69	0700058M	CF 1/16W 22K-JB
RK70	0700036M	CF 1/16W 470-JB
RK71	0700055M	CF 1/16W 12K-JB
RK72	0700058M	CF 1/16W 22K-JB
RK73	0700036M	CF 1/16W 470-JB
RK74	0700055M	CF 1/16W 12K-JB
RK75	0700058M	CF 1/16W 22K-JB
RK76	0700036M	CF 1/16W 470-JB
RK77	0700055M	CF 1/16W 12K-JB
RK78	0700058M	CF 1/16W 22K-JB
RK79	0700046M	CF 1/16W 2.7K-JB
RK80	0700046M	CF 1/16W 2.7K-JB
RK81	0700046M	CF 1/16W 2.7K-JB
RK82	0700046M	CF 1/16W 2.7K-JB
RK83	0700046M	CF 1/16W 2.7K-JB
RK84	0700046M	CF 1/16W 2.7K-JB
RK85	0700048M	CF 1/16W 3.9K-JB
RK86	0700047M	CF 1/16W 3.3K-JB
RK89	0700046M	CF 1/16W 2.7K-JB
RK90	0700052M	CF 1/16W 6.8K-JB
RK91	0700054M	CF 1/16W 10K-JB
RK94	0100057M	CF 1/8W 470-JB
RK95	0700046M	CF 1/16W 2.7K-JB
RK96	0700046M	CF 1/16W 2.7K-JB
RK97	0700042M	CF 1/16W 1.2K-JB
RM01	0700041M	CF 1/16W 1.0K-JB
RM02	0700058M	CF 1/16W 22K-JB
RM03	0700045M	CF 1/16W 2.2K-JB
RM04	0100065M	CF 1/8W 1K-JB
RM05	0100065M	CF 1/8W 1K-JB
RM06	0700041M	CF 1/16W 1.0K-JB
RM07	0700043M	CF 1/16W 1.5K-JB
RM08	0700046M	CF 1/16W 2.7K-JB
RM09	0700049M	CF 1/16W 4.7K-JB
RM10	0100129M	CF 1/8W 470K-JB
RM11	0700041M	CF 1/16W 1.0K-JB
RM12	0100125M	CF 1/8W 330K-JB
RM13	0114149M	CF SRD 1/4 PF 560-J
RM14	0100125M	CF 1/8W 330K-JB
RM15	0700054M	CF 1/16W 10K-JB
RN01	0700057M	CF 1/16W 18K-JB
RN02	0700041M	CF 1/16W 1.0K-JB
RN03	0700041M	CF 1/16W 1.0K-JB
RN04	0700067M	CF 1/16W 100K-JB
RN05	0700052M	CF 1/16W 6.8K-JB
RN06	0700051M	CF 1/16W 5.6K-JB
RN07	0700054M	CF 1/16W 10K-JB
RN08	0700057M	CF 1/16W 18K-JB
RN09	0700061M	CF 1/16W 33K-JB
RN10	0700054M	CF 1/16W 10K-JB
RN11	0700058M	CF 1/16W 22K-JB
RN12	0700051M	CF 1/16W 5.6K-JB
RN13	0700044M	CF 1/16W 1.8K-JB
RN14	0700054M	CF 1/16W 10K-JB
RN15	0700058M	CF 1/16W 22K-JB
RN16	0700064M	CF 1/16W 56K-JB
RN18	0700057M	CF 1/16W 18K-JB
RN19	0700049M	CF 1/16W 4.7K-JB
RX01	0700059M	CF 1/16W 27K-JB
RX02	0700067M	CF 1/16W 100K-JB
RX03	0700027M	CF 1/16W 100-JB
RX04	0700039M	CF 1/16W 820-JB
RX05	0700036M	CF 1/16W 470-JB
RX06	0700043M	CF 1/16W 1.5K-JB
RX07	0700027M	CF 1/16W 100-JB
RX08	0700039M	CF 1/16W 820-JB
RX12	0700043M	CF 1/16W 1.5K-JB
RX13	0700039M	CF 1/16W 820-JB
RX14	0700063M	CF 1/16W 47K-JB
RX15	0700036M	CF 1/16W 470-JB
RX16	0700033M	CF 1/16W 270-JB
RX17	0100125M	CF 1/8W 330K-JB
RX18	0700056M	CF 1/16W 15K-JB
RX19	0700041M	CF 1/16W 1.0K-JB
RX20	0187054M	CF 1/16W 360-JB
RX21	0700051M	CF 1/16W 5.6K-JB
RX22	0700041M	CF 1/16W 1.0K-JB
RX23	0700035M	CF 1/16W 390-JB
RX24	0700054M	CF 1/16W 10K-JB
RX25	0700054M	CF 1/16W 10K-JB
RX26	0100130M	CF 1/8W 510K-JB
RX27	0700047M	CF 1/16W 3.3K-JB
RX28	0700039M	CF 1/16W 820-JB
RX29	0700027M	CF 1/16W 100-JB
RX30	0700039M	CF 1/16W 820-JB
RX31	0700041M	CF 1/16W 1.0K-JB
RX32	0700039M	CF 1/16W 820-JB
RX33	0700041M	CF 1/16W 1.0K-JB
RX34	0700057M	CF 1/16W 18K-JB
RX35	0700064M	CF 1/16W 56K-JB
RX36	0700036M	CF 1/16W 470-JB
RX37	0700041M	CF 1/16W 1.0K-JB
RX38	0700033M	CF 1/16W 270-JB
RX39	0700054M	CF 1/16W 10K-JB
RX40	0700027M	CF 1/16W 100-JB
RX41	0700039M	CF 1/16W 820-JB
RX42	0700041M	CF 1/16W 1.0K-JB
RX43	0700044M	CF 1/16W 1.8K-JB
RX44	0700041M	CF 1/16W 1.0K-JB
RX45	0700062M	CF 1/16W 39K-JB
RX46	0700054M	CF 1/16W 10K-JB
RX47	0700036M	CF 1/16W 470-JB
RX48	0700034M	CF 1/16W 330-JB
RX49	0700027M	CF 1/16W 100-JB
RX50	0700039M	CF 1/16W 820-JB
RX51	0700047M	CF 1/16W 3.3K-JB
RX52	0700047M	CF 1/16W 3.3K-JB
RX53	0187088M	CF 1/16W 9.1K-JB
RX55	0700027M	CF 1/16W 100-JB
RX57	0700054M	CF 1/16W 10K-JB
RX58	0100115M	CF 1/8W 120K-JB
RY01	0700027M	CF 1/16W 100-JB
RY05	0700027M	CF 1/16W 100-JB
RY06	0700027M	CF 1/16W 100-JB
RY07	0700027M	CF 1/16W 100-JB
RY08	0700041M	CF 1/16W 1.0K-JB
RY09	0700041M	CF 1/16W 1.0K-JB
RY10	0700041M	CF 1/16W 1.0K-JB
RY11	0700041M	CF 1/16W 1.0K-JB
RY12	0700027M	CF 1/16W 100-JB
RY14	0700027M	CF 1/16W 100-JB
RY15	0700027M	CF 1/16W 100-JB
RY16	0700045M	CF 1/16W 2.2K-JB
RY17	0700047M	CF 1/16W 3.3K-JB

REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characters important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	PART DESCRIPTION
RY18	0700054M	CF 1/16W 10K-JB
RY19	0700041M	CF 1/16W 1.0K-JB
RY31	0100038M	CF 1/8W 75-JB
RY32	0100038M	CF 1/8W 75-JB
RY33	0700063M	CF 1/16W 47K-JB
RY34	0700058M	CF 1/16W 22K-JB
RY35	0100038M	CF 1/8W 75-JB
RY39	0700034M	CF 1/16W 330-JB
RY40	0114137M	CF 1/4W 180-JB
RY41	0100037M	CF 1/8W 68-JB
RY42	0700067M	CF 1/16W 100K-JB
RY43	0700041M	CF 1/16W 1.0K-JB
RY44	0700054M	CF 1/16W 10K-JB
RY45	0700039M	CF 1/16W 820-JB
RY47	0700054M	CF 1/16W 10K-JB
RY48	0700027M	CF 1/16W 100-JB
RY50	0700027M	CF 1/16W 100-JB
RY51	0700038M	CF 1/16W 680-JB
RY52	0700043M	CF 1/16W 1.5K-JB
RY53	0700039M	CF 1/16W 820-JB
RY54	0700063M	CF 1/16W 47K-JB
RY56	0700027M	CF 1/16W 100-JB
RY57	0100055M	CF 1/8W 390-JB
RY58	0700041M	CF 1/16W 1.0K-JB
RY59	0700046M	CF 1/16W 2.7K-JB
RY60	0700043M	CF 1/16W 1.5K-JB
RY61	0100115M	CF 1/8W 120K-JB
RY62	0700052M	CF 1/16W 6.8K-JB
RY63	0700057M	CF 1/16W 18K-JB
RY64	0100121M	CF 1/8W 220K-JB
RY65	0700061M	CF 1/16W 33K-JB
RY66	0700029M	CF 1/16W 150-JB
RY67	0700039M	CF 1/16W 820-JB
RY68	0700034M	CF 1/16W 330-JB
RY77	0100123M	CF 1/8W 270K-JB
RY78	0100123M	CF 1/8W 270K-JB
RZ02	0700054M	CF 1/16W 10K-JB
RZ03	0700054M	CF 1/16W 10K-JB
RZ04	0700045M	CF 1/16W 2.2K-JB
RZ05	0700045M	CF 1/16W 2.2K-JB
RZ06	0700041M	CF 1/16W 1.0K-JB
RZ07	0700041M	CF 1/16W 1.0K-JB
RZ08	0700058M	CF 1/16W 22K-JB
RZ09	0147152	WW 3W 27-JA
RZ12	0700041M	CF 1/16W 1.0K-JB
R0A1	0700058M	CF 1/16W 22K-JB
R0A2	0700041M	CF 1/16W 1.0K-JB
R0A3	0700058M	CF 1/16W 22K-JB
R0A5	0700027M	CF 1/16W 100-JB
R0A6	0700037M	CF 1/16W 560-JB
R0A7	0700027M	CF 1/16W 100-JB
R0A8	0700041M	CF 1/16W 1.0K-JB
R0A9	0700041M	CF 1/16W 1.0K-JB
R0C1	0700041M	CF 1/16W 1.0K-JB
R0C3	0700058M	CF 1/16W 22K-JB
R0C4	0700027M	CF 1/16W 100-JB
R0C5	0700027M	CF 1/16W 100-JB
R0C7	0700056M	CF 1/16W 15K-JB
R0C8	0700063M	CF 1/16W 47K-JB
R0C9	0700054M	CF 1/16W 10K-JB
R0E1	0100041M	CF 1/8W 100-JB
R0E2	0700054M	CF 1/16W 10K-JB
R0E3	0114149M	CF SRD 1/4 PF 560-J
R0E4	0700058M	CF 1/16W 22K-JB
R0E5	0700041M	CF 1/16W 1.0K-JB
R0E6	0700063M	CF 1/16W 47K-JB
R0E7	0700055M	CF 1/16W 12K-JB
R0E8	0700054M	CF 1/16W 10K-JB
R0E9	0700041M	CF 1/16W 1.0K-JB
R0F5	0700041M	CF 1/16W 1.0K-JB
R0F6	0700041M	CF 1/16W 1.0K-JB
R0F7	0700067M	CF 1/16W 100K-JB
R0F8	0700041M	CF 1/16W 1.0K-JB
R0F9	0700051M	CF 1/16W 5.6K-JB
R0G1	0100123R	CF 1/8W 270K-J
R0G2	0700041M	CF 1/16W 1.0K-JB
R0G3	0700041M	CF 1/16W 1.0K-JB
R0G4	0700041M	CF 1/16W 1.0K-JB
R0G5	0700027M	CF 1/16W 100-JB
R0G6	0700027M	CF 1/16W 100-JB
R0G7	0100065M	CF 1/8W 1K-JB
R0G8	0100089M	CF 1/8W 10K-JB
R0G9	0100065M	CF 1/8W 1K-JB
R0H1	0100065M	CF 1/8W 1K-JB
R0H2	0700049M	CF 1/16W 4.7K-JB
R0H3	0700058M	CF 1/16W 22K-JB
R0H4	0700067M	CF 1/16W 100K-JB
R0H5	0700049M	CF 1/16W 4.7K-JB
R0H6	0700031M	CF 1/16W 180-JB
R0H7	0700066M	CF 1/16W 82K-JB
R0H8	0100107M	CF 1/8W 56K-JB
R0L1	0700041M	CF 1/16W 1.0K-JB
R0L3	0700058M	CF 1/16W 22K-JB
R0L4	0700058M	CF 1/16W 22K-JB
R0L5	0700058M	CF 1/16W 22K-JB
R0L6	0700041M	CF 1/16W 1.0K-JB
R0L7	0700054M	CF 1/16W 10K-JB
R0L8	0700042M	CF 1/16W 1.2K-JB
R0L9	0700054M	CF 1/16W 10K-JB
R0M1	0700054M	CF 1/16W 10K-JB
R0M2	0700049M	CF 1/16W 4.7K-JB
R0M3	0700054M	CF 1/16W 10K-JB
R001	0700054M	CF 1/16W 10K-JB
R002	0700066M	CF 1/16W 82K-JB
R003	0700051M	CF 1/16W 5.6K-JB
R004	0700054M	CF 1/16W 10K-JB
R005	0700063M	CF 1/16W 47K-JB
R006	0700063M	CF 1/16W 47K-JB
R008	0700063M	CF 1/16W 47K-JB
R009	0700054M	CF 1/16W 10K-JB
R010	0700054M	CF 1/16W 10K-JB
R011	0700041M	CF 1/16W 1.0K-JB
R012	0700064M	CF 1/16W 56K-JB
R014	0700054M	CF 1/16W 10K-JB
R015	0700055M	CF 1/16W 12K-JB
R016	0700051M	CF 1/16W 5.6K-JB
R017	0700041M	CF 1/16W 1.0K-JB
R018	0700032M	CF 1/16W 220-JB
R019	0100041M	CF 1/8W 100-JB
R020	0700032M	CF 1/16W 220-JB
R021	0700041M	CF 1/16W 1.0K-JB
R022	0700041M	CF 1/16W 1.0K-JB
R023	0700036M	CF 1/16W 470-JB
R024	0150110	VR RV6 500-B
R025	0700036M	CF 1/16W 470-JB
R026	0150110	VR RV6 500-B
R028	0700041M	CF 1/16W 1.0K-JB
R029	0150111	VR RV6 1K-B

REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characters important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	PART DESCRIPTION	SYMBOL NO.	PART NO.	PART DESCRIPTION
R031	0700032M	CF 1/16W 220-JB	R102	0700041M	CF 1/16W 1.0K-JB
R032	0700027M	CF 1/16W 100-JB	R103	0700038M	CF 1/16W 680-JB
R033	0700027M	CF 1/16W 100-JB	R104	0700041M	CF 1/16W 1.0K-JB
R034	0700054M	CF 1/16W 10K-JB	R105	0700041M	CF 1/16W 1.0K-JB
R035	0700058M	CF 1/16W 22K-JB	R106	0700038M	CF 1/16W 680-JB
R036	0700027M	CF 1/16W 100-JB	R107	0700054M	CF 1/16W 10K-JB
R037	0700058M	CF 1/16W 22K-JB	R108	0100065M	CF 1/8W 1K-JB
R038	0700027M	CF 1/16W 100-JB	R109	0700054M	CF 1/16W 10K-JB
R039	0700041M	CF 1/16W 1.0K-JB	R111	0700027M	CF 1/16W 100-JB
R040	0700041M	CF 1/16W 1.0K-JB	R112	0700054M	CF 1/16W 10K-JB
R041	0700041M	CF 1/16W 1.0K-JB	R113	0700051M	CF 1/16W 5.6K-JB
R042	0700051M	CF 1/16W 5.6K-JB	R114	0700041M	CF 1/16W 1.0K-JB
R043	0700027M	CF 1/16W 100-JB	R115	0700041M	CF 1/16W 1.0K-JB
R044	0700058M	CF 1/16W 22K-JB	R116	0700041M	CF 1/16W 1.0K-JB
R045	0700041M	CF 1/16W 1.0K-JB	R117	0700041M	CF 1/16W 1.0K-JB
R046	0700058M	CF 1/16W 22K-JB	R118	0100059M	CF 1/8W 560-JB
R047	0700041M	CF 1/16W 1.0K-JB	R119	0100059M	CF 1/8W 560-JB
R048	0700058M	CF 1/16W 22K-JB	R121	0700041M	CF 1/16W 1.0K-JB
R049	0700041M	CF 1/16W 1.0K-JB	R122	0700041M	CF 1/16W 1.0K-JB
R050	0700057M	CF 1/16W 18K-JB	R123	0700041M	CF 1/16W 1.0K-JB
R051	0700049M	CF 1/16W 4.7K-JB	R124	0700041M	CF 1/16W 1.0K-JB
R052	0700058M	CF 1/16W 22K-JB	R125	0700041M	CF 1/16W 1.0K-JB
R053	0700054M	CF 1/16W 10K-JB	R126	0700059M	CF 1/16W 27K-JB
R054	0700058M	CF 1/16W 22K-JB	R127	0700041M	CF 1/16W 1.0K-JB
R055	0700027M	CF 1/16W 100-JB	R128	0700041M	CF 1/16W 1.0K-JB
R056	0700027M	CF 1/16W 100-JB	R129	0700041M	CF 1/16W 1.0K-JB
R057	0700041M	CF 1/16W 1.0K-JB	R130	0700022M	CF 1/16W 39-J
R058	0700041M	CF 1/16W 1.0K-JB	R131	0700041M	CF 1/16W 1.0K-JB
R059	0700058M	CF 1/16W 22K-JB	R132	0700058M	CF 1/16W 22K-JB
R060	0700041M	CF 1/16W 1.0K-JB	R133	0700058M	CF 1/16W 22K-JB
R061	0700042M	CF 1/16W 1.2K-JB	R134	0700041M	CF 1/16W 1.0K-JB
R062	0700042M	CF 1/16W 1.2K-JB	R135	0700041M	CF 1/16W 1.0K-JB
R063	0700042M	CF 1/16W 1.2K-JB	R136	0700062M	CF 1/16W 39K-JB
R064	0700043M	CF 1/16W 1.5K-JB	R3A4	0700041M	CF 1/16W 1.0K-JB
R066	0700027M	CF 1/16W 100-JB	R3A5	0700041M	CF 1/16W 1.0K-JB
R067	0700051M	CF 1/16W 5.6K-JB	R3A6	0700032M	CF 1/16W 220-JB
R068	0700027M	CF 1/16W 100-JB	R3A7	0700032M	CF 1/16W 220-JB
R069	0700049M	CF 1/16W 4.7K-JB	R3A8	0700032M	CF 1/16W 220-JB
R070	0700051M	CF 1/16W 5.6K-JB	R3A9	0700041M	CF 1/16W 1.0K-JB
R072	0700052M	CF 1/16W 6.8K-JB	R3C1	0700041M	CF 1/16W 1.0K-JB
R073	0700027M	CF 1/16W 100-JB	R3C2	0700041M	CF 1/16W 1.0K-JB
R074	0700058M	CF 1/16W 22K-JB	R3C3	0700041M	CF 1/16W 1.0K-JB
R075	0700058M	CF 1/16W 22K-JB	R3C4	0700041M	CF 1/16W 1.0K-JB
R076	0700041M	CF 1/16W 1.0K-JB	R3C5	0700055M	CF 1/16W 12K-JB
R077	0700058M	CF 1/16W 22K-JB	R3C6	0700054M	CF 1/16W 10K-JB
R078	0700027M	CF 1/16W 100-JB	R3C7	0700063M	CF 1/16W 47K-JB
R079	0700058M	CF 1/16W 22K-JB	R3C8	0700063M	CF 1/16W 47K-JB
R080	0700027M	CF 1/16W 100-JB	R306	0700058M	CF 1/16W 22K-JB
R081	0700049M	CF 1/16W 4.7K-JB	R307	0700058M	CF 1/16W 22K-JB
R082	0700032M	CF 1/16W 220-JB	R308	0700049M	CF 1/16W 4.7K-JB
R083	0700041M	CF 1/16W 1.0K-JB	R309	0700065M	CF 1/16W 68K-JB
R084	0700041M	CF 1/16W 1.0K-JB	R310	0700049M	CF 1/16W 4.7K-JB
R085	0700041M	CF 1/16W 1.0K-JB	R311	0700061M	CF 1/16W 33K-JB
R086	0700041M	CF 1/16W 1.0K-JB	R312	0700029M	CF 1/16W 150-JB
R087	0700041M	CF 1/16W 1.0K-JB	R313	0700046M	CF 1/16W 2.7K-JB
R088	0700041M	CF 1/16W 1.0K-JB	R314	0700054M	CF 1/16W 10K-JB
R089	0700027M	CF 1/16W 100-JB	R315	0700065M	CF 1/16W 68K-JB
R090	0700041M	CF 1/16W 1.0K-JB	R316	0700067M	CF 1/16W 100K-JB
R094	0700045M	CF 1/16W 2.2K-JB	R317	0700064M	CF 1/16W 56K-JB
R095	0700054M	CF 1/16W 10K-JB	R318	0700058M	CF 1/16W 22K-JB
R097	0700054M	CF 1/16W 10K-JB	R322	0700065M	CF 1/16W 68K-JB
R098	0700054M	CF 1/16W 10K-JB	R323	0700052M	CF 1/16W 6.8K-JB
R099	0700041M	CF 1/16W 1.0K-JB	R324	0700046M	CF 1/16W 2.7K-JB
R101	0700039M	CF 1/16W 820-JB	R325	0187080M	CF 1/16W 4.3K-JB

REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characters important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	PART DESCRIPTION
R326	0700054M	CF 1/16W 10K-JB
R327	0700054M	CF 1/16W 10K-JB
R328	0700066M	CF 1/16W 82K-JB
R329	0700067M	CF 1/16W 100K-JB
R330	0700058M	CF 1/16W 22K-JB
R332	0700048M	CF 1/16W 3.9K-JB
R333	0700034M	CF 1/16W 330-JB
R334	0700054M	CF 1/16W 10K-JB
R335	0700034M	CF 1/16W 330-JB
R336	0700034M	CF 1/16W 330-JB
R337	0700027M	CF 1/16W 100-JB
R338	0700051M	CF 1/16W 5.6K-JB
R339	0150113	VR RV6 5K-B
R340	0700041M	CF 1/16W 1.0K-JB
R341	0700039M	CF 1/16W 820-JB
R342	0700033M	CF 1/16W 270-JB
R343	0700047M	CF 1/16W 3.3K-JB
R344	0700041M	CF 1/16W 1.0K-JB
R345	0100125M	CF 1/8W 330K-JB
R346	0700041M	CF 1/16W 1.0K-JB
R347	0700062M	CF 1/16W 39K-JB
R348	0100051M	CF 1/8W 270-JB
R349	0700037M	CF 1/16W 560-JB
R350	0114135M	CF 1/4W 150-JB
R360	0700033M	CF 1/16W 270-JB
R361	0700061M	CF 1/16W 33K-JB
R362	0700029M	CF 1/16W 150-JB
R363	0700049M	CF 1/16W 4.7K-JB
R364	0700051M	CF 1/16W 5.6K-JB
R365	0700064M	CF 1/16W 56K-JB
R366	0100133M	CF 1/8W 680K-JB
R370	0700052M	CF 1/16W 6.8K-JB
R371	0700049M	CF 1/16W 4.7K-JB
R372	0700046M	CF 1/16W 2.7K-JB
R373	0700049M	CF 1/16W 4.7K-JB
R374	0700048M	CF 1/16W 3.9K-JB
R375	0700048M	CF 1/16W 3.9K-JB
R376	0700041M	CF 1/16W 1.0K-JB
R377	0179536M	MG 1M J TAPE
R378	0700054M	CF 1/16W 10K-JB
R379	0700052M	CF 1/16W 6.8K-JB
R380	0700067M	CF 1/16W 100K-JB
R381	0100119M	CF 1/8W 180K-JB
R382	0700042M	CF 1/16W 1.2K-JB
R401	0700054M	CF 1/16W 10K-JB
R402	0700041M	CF 1/16W 1.0K-JB
R404	0700041M	CF 1/16W 1.0K-JB
R405	0700045M	CF 1/16W 2.2K-JB
R406	0700045M	CF 1/16W 2.2K-JB
R407	0700045M	CF 1/16W 2.2K-JB
R408	0700045M	CF 1/16W 2.2K-JB
R411	0700063M	CF 1/16W 47K-JB
R412	0700063M	CF 1/16W 47K-JB
R413	0700067M	CF 1/16W 100K-JB
R414	0700036M	CF 1/16W 470-JB
R415	0700041M	CF 1/16W 1.0K-JB
R416	0700058M	CF 1/16W 22K-JB
R417	0119505G	MF 2.2-J
R418	0119505G	MF 2.2-J
R419	0700065M	CF 1/16W 68K-JB
R420	0700065M	CF 1/16W 68K-JB
R421	0114161M	CF 1/4W 1K-JB
R422	0114161M	CF 1/4W 1K-JB
R423	0700065M	CF 1/16W 68K-JB
R425	0700054M	CF 1/16W 10K-JB
R5E2	0700056M	CF 1/16W 15K-JB
R5E3	0114131M	CF 1/4W 100-JB
R5E4	0700054M	CF 1/16W 10K-JB
R5E5	0700027M	CF 1/16W 100-JB
R5E6	0700038M	CF 1/16W 680-JB
R5E7	0700032M	CF 1/16W 220-JB
R5E9	0700056M	CF 1/16W 15K-JB
R5F1	0700055M	CF 1/16W 12K-JB
R5F2	0700027M	CF 1/16W 100-JB
R5F3	0700027M	CF 1/16W 100-JB
R5F4	0700053M	CF 1/16W 8.2K-JB
R5F5	0700057M	CF 1/16W 18K-JB
R5F6	0700041M	CF 1/16W 1.0K-JB
R5F7	0119691M	MF 1W 0.33JB
R5F8	0119691M	MF 1W 0.33JB
R5F9	0119691M	MF 1W 0.33JB
R5G1	0700049M	CF 1/16W 4.7K-JB
R502	0100037M	CF 1/8W 68-JB
R503	0100049M	CF 1/8W 220-JB
R504	0100049M	CF 1/8W 220-JB
R505	0100049M	CF 1/8W 220-JB
R506	0100041M	CF 1/8W 100-JB
R507	0187086M	CF 1/16W 7.5K-JB
R508	0700054M	CF 1/16W 10K-JB
R510	0700041M	CF 1/16W 1.0K-JB
R511	0100129M	CF 1/8W 470K-JB
R512	0700065M	CF 1/16W 68K-JB
R513	0700061M	CF 1/16W 33K-JB
R514	0700067M	CF 1/16W 100K-JB
R515	0700054M	CF 1/16W 10K-JB
R516	0700054M	CF 1/16W 10K-JB
R517	0700054M	CF 1/16W 10K-JB
R518	0700067M	CF 1/16W 100K-JB
R519	0700065M	CF 1/16W 68K-JB
R520	0700067M	CF 1/16W 100K-JB
R521	0700059M	CF 1/16W 27K-JB
R522	0700054M	CF 1/16W 10K-JB
R523	0700054M	CF 1/16W 10K-JB
R524	0700047M	CF 1/16W 3.3K-JB
R525	0700061M	CF 1/16W 33K-JB
R526	0700046M	CF 1/16W 2.7K-JB
R527	0700049M	CF 1/16W 4.7K-JB
R528	0700054M	CF 1/16W 10K-JB
R529	0700054M	CF 1/16W 10K-JB
R530	0700029M	CF 1/16W 150-JB
R531	0700054M	CF 1/16W 10K-JB
R537	0700041M	CF 1/16W 1.0K-JB
R538	0700041M	CF 1/16W 1.0K-JB
R539	0700041M	CF 1/16W 1.0K-JB
R540	0700041M	CF 1/16W 1.0K-JB
R541	0700041M	CF 1/16W 1.0K-JB
R542	0700041M	CF 1/16W 1.0K-JB
R543	0700041M	CF 1/16W 1.0K-JB
R544	0700041M	CF 1/16W 1.0K-JB
R545	0700041M	CF 1/16W 1.0K-JB
R546	0100047M	CF 1/8W 180-JB
R547	0700041M	CF 1/16W 1.0K-JB
R548	0700041M	CF 1/16W 1.0K-JB
R549	0700041M	CF 1/16W 1.0K-JB
R550	0700027M	CF 1/16W 100-JB
R551	0700032M	CF 1/16W 220-JB
R555	0700032M	CF 1/16W 220-JB
R556	0700032M	CF 1/16W 220-JB

REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characters important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	PART DESCRIPTION
R557	0700041M	CF 1/16W 1.0K-JB
R558	0100062M	CF 1/8W 750-JB
R559	0700041M	CF 1/16W 1.0K-JB
R561	0700054M	CF 1/16W 10K-JB
R562	0700058M	CF 1/16W 22K-JB
R563	0700058M	CF 1/16W 22K-JB
R607	0179536M	MG 1M J TAPE
R608	0700063M	CF 1/16W 47K-JB
R609	0100065M	CF 1/8W 1K-JB
R610	0700061M	CF 1/16W 33K-JB
R611	0700064M	CF 1/16W 56K-JB
R612	0150307	VR RV06 30K-B
R613	0700065M	CF 1/16W 68K-JB
R614	0700061M	CF 1/16W 33K-JB
R615	0700038M	CF 1/16W 680-JB
R616	0700064M	CF 1/16W 56K-JB
R617	0119722M	MF 1.0-JB/W
R618	0119722M	MF 1.0-JB/W
R619	0700027M	CF 1/16W 100-JB
R620	0700054M	CF 1/16W 10K-JB
R621	0700051M	CF 1/16W 5.6K-JB
R622	0700065M	CF 1/16W 68K-JB
R623	0113766M	CF SRD1/2P-B 4.7K-J
R624	0110121S	MF 100-JS
R625	0113725M	CF SRD1/2P-B 100-J
R626	0113725M	CF SRD1/2P-B 100-J
R627	0113725M	CF SRD1/2P-B 100-J
R635	0100053M	CF 1/8W 330-JB
R636	0100063M	CF 1/8W 820-JB
R637	0700044M	CF 1/16W 1.8K-JB
R638	0700058M	CF 1/16W 22K-JB
R639	0700041M	CF 1/16W 1.0K-JB
R640	0700041M	CF 1/16W 1.0K-JB
R641	0700052M	CF 1/16W 6.8K-JB
R642	0700061M	CF 1/16W 33K-JB
R643	0700056M	CF 1/16W 15K-JB
R646	0700045M	CF 1/16W 2.2K-JB
R647	0700054M	CF 1/16W 10K-JB
R648	0700052M	CF 1/16W 6.8K-JB
R649	0150307	VR RV06 30K-B
R650	0700051M	CF 1/16W 5.6K-JB
R651	0700058M	CF 1/16W 22K-JB
R652	0700063M	CF 1/16W 47K-JB
R653	0700041M	CF 1/16W 1.0K-JB
R654	0700047M	CF 1/16W 3.3K-JB
R655	0700067M	CF 1/16W 100K-JB
R656	0700045M	CF 1/16W 2.2K-JB
R658	0114135M	CF 1/4W 150-JB
R659	0100045M	CF 1/8W 150-JB
R660	0119731M	MF 1W R68-K TAPE
R661	0700054M	CF 1/16W 10K-JB
R662	0700041M	CF 1/16W 1.0K-JB
R663	0700059M	CF 1/16W 27K-JB
R664	0700041M	CF 1/16W 1.0K-JB
R665	0700054M	CF 1/16W 10K-JB
R666	0700059M	CF 1/16W 27K-JB
R667	0119732M	MF 1.2-JB
R680	0700039M	CF 1/16W 820-JB
R699	0700061M	CF 1/16W 33K-JB
R701	0700039M	CF 1/16W 820-JB
R702	0700041M	CF 1/16W 1.0K-JB
R703	0113770M	CF SRD1/2P-B 6.8K-J
R704	0110355S	MF 3W 2.7K-J
R705	0110351S	MF 1.8K-J
⚠R706	0119688M	MF 1W 0.22-JB
R707	0100031M	CF 1/8W 39-JB
R708	0113791M	CF 1/2W 47K-JB
R709	0113785M	CF SRD1/2P-B 27K-J
R710	0110229S	MF 220-JS
⚠R711	0119512G	MG RN1/4P 1.0-JF
⚠R712	0119514G	MF 10-J
R713	0113705M	CF SRD1/2P-B 15-J
⚠R714	0700063M	CF 1/16W 47K-JB
R715	0100085M	CF 1/8W 6.8K-JB
R716	0700042M	CF 1/16W 1.2K-JB
R717	0114149M	CF SRD 1/4 PF 560-J
R718	0100127M	CF 1/8W 390K-JB
R719	0700054M	CF 1/16W 10K-JB
R721	0140327S	WW 6.8K-J 5W
R723	0110215S	MF 2W56-J
R724	0114177M	CF SRD 1/4 P 4.7K-J
R725	0700052M	CF 1/16W 6.8K-JB
R726	0700048M	CF 1/16W 3.9K-JB
R727	0700049M	CF 1/16W 4.7K-JB
R728	0700045M	CF 1/16W 2.2K-JB
R729	0700047M	CF 1/16W 3.3K-JB
R730	0113729M	CF 1/2W 150-JB
R731	0110101S	MF 1W 15-JS
R734	0110129S	MF 220-JS
R735	0110129S	MF 220-JS
⚠R741	0700046M	CF 1/16W 2.7K-JB
R742	0114183M	CF SRD 1/4 P 8.2K-J
R743	0700051M	CF 1/16W 5.6K-JB
R744	0700052M	CF 1/16W 6.8K-JB
R745	0700056M	CF 1/16W 15K-JB
R746	0114139M	CF SRD 1/4 P 220-J
R801	0140326S	MF 5.6K OHM +-5% 5W
R803	0113744	CF 560 OHM +-5% 1/2W
R806	0113815	CF 470K OHM +-5% 1/2W
R809	0100065	CF 1K OHM +-5% 1/8W
R810	0100035	CF 56 OHM +-5% 1/8W
R811	0100065	CF 1K OHM +-5% 1/8W
R812	0100044	CF 130 OHM +-5% 1/8W
R815	0100059	CF 560 OHM +-5% 1/8W
R817	0100041	CF 100 OHM +-5% 1/8W
R818	0100049	CF 220 OHM +-5% 1/8W
R831	0140326S	MF 5.6K OHM +-5% 5W
R833	0113744	CF 560 OHM +-5% 1/2W
R836	0113815	CF 470K OHM +-5% 1/2W
R840	0100035	CF 56 OHM +-5% 1/8W
R841	0100065	CF 1K OHM +-5% 1/8W
R842	0100033	CF 47 OHM +-5% 1/8W
R843	0150001	VR 200 OHM-B
R845	0100059	CF 560 OHM +-5% 1/8W
R847	0100041	CF 100 OHM +-5% 1/8W
R850	0100089	CF 10K OHM +-5% 1/8W
R851	0100051	CF 270 OHM +-5% 1/8W
R861	0140326S	MF 5.6K OHM +-5% 5W
R863	0113744	CF 560 OHM +-5% 1/2W
R866	0113815	CF 470K OHM +-5% 1/2W
R870	0100035	CF 56 OHM +-5% 1/8W
R871	0100065	CF 1K OHM +-5% 1/8W
R872	0100033	CF 47 OHM +-5% 1/8W
R873	0150001	VR 200 OHM-B
R875	0100059	CF 560 OHM +-5% 1/8W
R877	0100049	CF 220 OHM +-5% 1/8w
R880	0100089	CF 10K OHM +-5% 1/8W
R881	0100043	CF 120 OHM +-5% 1/8W

REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characters important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	PART DESCRIPTION
R903	0147060	WW 2W 33-K
⚠R904	0147804	WW 15W 0.75-KM CEMENTED
R905	0148009	WW 2W 0.056-J
R906	0700037M	CF 1/16W 560-JB
R907	0700046M	CF 1/16W 2.7K-JB
R908	0700054M	CF 1/16W 10K-JB
R909	0700047M	CF 1/16W 3.3K-JB
R911	0700049M	CF 1/16W 4.7K-JB
R912	0700049M	CF 1/16W 4.7K-JB
R913	0110265S	MF 6.8K-JS
R914	0700023M	CF 1/16W 47-J
R915	0700027M	CF 1/16W 100-JB
R916	0700036M	CF 1/16W 470-JB
R917	0700061M	CF 1/16W 33K-JB
R918	0114161M	CF 1/4W 1K-JB
R920	0110237S	MF 2W 470-J
R921	0700057M	CF 1/16W 18K-JB
R922	0700057M	CF 1/16W 18K-JB
R923	0700047M	CF 1/16W 3.3K-JB
R924	0700047M	CF 1/16W 3.3K-JB
R932	0110145S	MF 1.0K-JS
⚠R934	0119839M	MF 0.56-J 1W
R935	0700054M	CF 1/16W 10K-JB
R936	0700058M	CF 1/16W 22K-JB
R937	0700063M	CF 1/16W 47K-JB
⚠R938	0113797M	CF 1/2W 82K-JB
⚠R939	0700051M	CF 1/16W 5.6K-JB
R940	0700054M	CF 1/16W 10K-JB
R941	0700054M	CF 1/16W 10K-JB
R942	0700058M	CF 1/16W 22K-JB
R943	0700036M	CF 1/16W 470-JB
R944	0700041M	CF 1/16W 1.0K-JB
⚠R945	0700039M	CF 1/16W 820-JB
⚠R946	0700043M	CF 1/16W 1.5K-JB
R947	0700041M	CF 1/16W 1.0K-JB
R948	0700045M	CF 1/16W 2.2K-JB
R949	0700038M	CF 1/16W 680-JB
R950	0700039M	CF 1/16W 820-JB
R951	0700049M	CF 1/16W 4.7K-JB
R952	0700043M	CF 1/16W 1.5K-JB
R953	0700051M	CF 1/16W 5.6K-JB
R954	0700051M	CF 1/16W 5.6K-JB
R956	0700045M	CF 1/16W 2.2K-JB
R958	0700067M	CF 1/16W 100K-JB
R959	0700051M	CF 1/16W 5.6K-JB
R972	0110145S	MF 1.0K-JS
R973	0700042M	CF 1/16W 1.2K-JB
R980	0700045M	CF 1/16W 2.2K-JB
R982	0700056M	CF 1/16W 15K-JB
R983	0700037M	CF 1/16W 560-JB
R999	0113698M	CF 1/2W 8.2-J
		TRANSFORMERS
⚠T701	2260291	HORIZONTAL DRIVE TRANSFORMER
⚠T702	2436493	FLYBACK TRANSFORMER
⚠T703	2272762	SPC TRANSFORMER
⚠T901	BT00161	POWER TRANSFORMER (40M 120V)
⚠T902	BT00141	SWITCHING TRANSFORMER (240VA)
		SWITCHES
SK01	2632922	TACT SWITCH
SM01	FE00061	1P TACT SWITCH
SM02	FE00061	1P TACT SWITCH
SM03	FE00061	1P TACT SWITCH
SM04	FE00061	1P TACT SWITCH
SM05	FE00061	1P TACT SWITCH
SM06	FE00061	1P TACT SWITCH
SM07	FE00061	1P TACT SWITCH
SZ01	FD00041	SLIDE SWITCH
S301	FD00011	SLIDE SWITCH
S901	2640576	RELAY(SDT-SS-112DM)
		MISCELLANEOUS
1	PH02577	CONTROL PANEL ASS'Y
4	NA03233	LENS CRT METAL
9	4524911	HEXAGON FLANGE HEAD B T-S 4*12
13	KS00044	MIRROR
15	4520771	4 x 18 HEXAGON HEAD TAPPING SCREW WITH WASHER
16	H810181	4.1 x 16 CROSS HEAD WOOD SCREW
17	81481100	8 x 1 DRYWALL SCREW
20	4137975	4 x 16 TAPPING SCREW WITH WASHER
21	QD02761	50FX18B CABINET ASS'Y
21	QD02762	50FX19K CABINET ASS'Y
21	QD02763	55FX20B CABINET ASS'Y
22	QD01531	BACK COVER
23	H810202	8 x 3/4 PAN HEAD DRYWALL SCREW
27	NT00741	SCREEN FRAME ASS'Y (50FX18B/19K)
27	NT00742	SCREEN FRAME ASS'Y (55FX20B)
⚠31	3393744	DELTA 77 A/B ASS'Y RB
⚠32	3393744	DELTA 77 A/B ASS'Y RB
⚠33	3393744	DELTA 77 A/B ASS'Y RB
34	QG00223	REAR COVER ASS'Y
	H512212	LOWER REAR BOARD (50FX18B/19K)
	H512215	LOWER REAR BOARD (55FX20B)
⚠40	4876424	LENS CRT BLOCK ASS'Y (R)
⚠41	4876425	LENS CRT BLOCK ASS'Y (G)
⚠42	4876426	LENS CRT BLOCK ASS'Y (B)
45	3189767	SCREEN ASS'Y
47	32110029	SPEAKER GRILL ASS'Y (50FX18B)
47	32110030	SPEAKER GRILL ASS'Y (50FX19K, 55FX20B)
55	H420671	MIRROR METAL A
56	H420682	MIRROR METAL B
	3204182	R/C LENS
	3700921	475T LAMP LENS A
	4517512	3 x 16 T-NE WITH WASHER
	H810211	M4X14 SCREW CROSS RECESS WITH WASHER
	PC01201	CONTROL BUTTON
	PH02582	CONTROL PANEL
⚠EANT	HP00341	ANT SW
EAN	2974056S	3J CONNE SEH UL1007 L=160
EB	2997977	1J MINI CONNE. L=910
EDC	2908848	9J CONNE. L=470
EDD	2908698	4J CONNE. L=470
EDG	2908878	PH CONNECTOR 10P L=470MM
EDH	2908728	5J CONNE. L=470
EFJ	2973837S	7J CONNE. L=1000
EFS	2958151	CONN. W/WIRE 1J (L=900)
EFT	2958134	CONN. W/WIRE MINI 4J (L1000)
EF92	2721351	FUSE HOLDER

REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characters important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	PART DESCRIPTION
EF96	2721351	FUSE HOLDER
EPP	2973631	3P CONNECTOR
ESL	2993567	CONN. W/WIRE MINI 5J (L1500) W/FASTON
ESR	2993557	CONN. W/WIRE MINI 4J (L1500) W/FASTON
ETU1	2979174	PLUG WITH COAXIAL CABLE
ETU2	2979172	MINI PLUG WITH COAXIAL CABLE
EVMC	EF04061	C0-03C-C2R5-651(CYR)
EY1	2908824	8J CONNE.L=750
EY2	2973744S	4J CONNE. L=750
E107	2958351	CONN. W/WIRE MINI 2J
E10	2776542	MAG-VM(C-C)NON6P
E11	3811322	DY INSULATOR
⚠E12	BY00501	DY-V80-6.7SS(3.00)M
E301	HL00227	REMOTE CONTROL CLU-417UI
⚠E801	2698671	CPT SOCKET
⚠E831	2698671	CPT SOCKET
⚠E861	2698671	CPT SOCKET
E9BN	4520883	3x12 SCREW WITH WASHER
E9DN	4520883	3x12 SCREW WITH WASHER
E9DW	4269926	WASHER
E9IN	4520883	3x12 SCREW WITH WASHER
E9IS	KL00051	IC SPRING
⚠E901	2972841	AC POWER CORD (FILTER IN)
E902	3772201	AC CORD HOLDER NYLON
E903	3739671	CORD HOLDER
E904	2782611	CENTER PIN
⚠GF01	CJ00071R	SPARK GAP
⚠G701	CJ00071R	SPARK GAP
⚠G801	CJ00071R	SPARK GAP
⚠G802	CJ00071R	SPARK GAP
⚠G831	CJ00071R	SPARK GAP
⚠G832	CJ00071R	SPARK GAP
⚠G861	CJ00071R	SPARK GAP
⚠G862	CJ00071R	SPARK GAP
JY01	ES00001	13P JACK WITH S TERMINALJACK
JZ01	ER00121	2L4P LEVER TERMINAL
NE02	4520883	3*12 SCREW WITH WASHER
NFP2	3763751	SK BINDER
NF02	4520883	3*12 SCREW WITH WASHER
NK03	4520883	3*12 SCREW WITH WASHER
NK06	4520885	3*16 SCREW WITH WASHER
NK07	4518772	SCREW3X12TAPPINGWITHWSR STEEL
NK08	4105241	CONV.IC SUPPORT BK
NK11	4520883	3*12 SCREW WITH WASHER
NPF2	3763751	SK BINDER
N003	3700342	WIRE CLAMP V0
N004	3876031	WIRE CLAMP W 13-20 PA
N005	3728273	PURSE LOCK (8)
N006	3785502	V LOCK 11.5
N007	3785511	V LOCK 16
N101	3443353	SHIELD CASE
N102	3443361	SHIELD PLATE
N153	H810221	PRT SCREW
N155	H830091	CRT SPRING
N201	QR07361	AP62 INSTRUCTION BOOK (E)
N402	4520883	3*12 SCREW WITH WASHER
N406	3335321	GROUNDING SPRING
N408	3332021	GX EARTH SPRING STEEL
N502	4520883	3*12 SCREW WITH WASHER
N505	3617451	HC SP LENS COVER
N602	4520883	3*12 SCREW WITH WASHER
N604	4520883	3*12 SCREW WITH WASHER
N702	4520883	3*12 SCREW WITH WASHER
N704	4159425	3X16 TAPPING WITH WASHER
N730	4159427	3X10 SCREW WITH WASHER STEEL
N801	3763751	SK BINDER
PB	2661756	1P PLUG PIN WITH BASE
PCB	ED00512	CP-TAC-L15P-A1
PCC	ED00516	CP-TAC-L20P-A1
PCD	ED00516	CP-TAC-L20P-A1
PCG	2903544	4P PLUG PIN WITH BASE
PCR	2903544	4P PLUG PIN WITH BASE
PCX	ED00512	CP-TAC-L15P-A1
PDC	2959058	PINPOST 9P PH
PDD	2959053	5P POST PIN 4P TYPE PH
PDG	2959059	PLUG PH PIN POST 10P
PDH	2959054	PINPOST 5P PH
PFJ	2902246	PLUG PIN SUB MINI 7P
PFT	2666191	4P PLUG PIN WITH BASE
PI1	2663821	2P SUB MINI PLUG PIN
PL	2903545	5P PLUG PIN WITH BASE
PMB	2665272	4P PLUG PIN WITH BASE
PMG	2665272	4P PLUG PIN WITH BASE
PMR	2665272	4P PLUG PIN WITH BASE
PP	2661752	3P PLUG PIN WITH BASE
PP31	2661751	PLUG PIN WITH BASE
PR	2903544	4P PLUG PIN WITH BASE
PSD1	2674631	5P PLUG PIN
PSD2	2674631	5P PLUG PIN
PSD3	2674634	8P PLUG PIN
PSD4	2674635	10P PLUG PIN
PSD5	2674636	12P FJ CONNECTOR (TYPE 12PL-FJ)
PSD6	2674631	5P PLUG PIN
PSU1	ED00576	CP-TAC-L20X-A1
PVMC	2902262	PLUG PIN SUB MINI 3P
PVM1	ED00566	CP-TAC-L10X-A1
PVM2	ED00566	CP-TAC-L10X-A1
PY1	2675287	PLUG PIN (PH 8P)
PY2	2902263	PLUG PIN SUB MINI 4P
P802	2661756	1P PLUG PIN WITH BASE
P832	2661756	1P PLUG PIN WITH BASE
P862	2661756	1P PLUG PIN WITH BASE
⚠U401	2412921	SPEAKER (L)
⚠U402	2412921	SPEAKER (R)
V1B	DE01083	CRT 180DLB22 (B)
V1G	DE01082	CRT 180DLB22 (G)
V1R	DE01081	CRT 180DLB22 (R)
XX01	2791501	CRYSTAL HC-49/U
XX02	BJ00141	COIL (LC FILTER) 3.58MHZ
XX03	BJ00112	COIL (LC FILTER) 6MHZ
X001	2168831	CRYSTAL CSA12.0MTZ
X5A1	2794401	DELAY LINE GLASS 63.5US=
X301	2786685	CRYSTAL CSB500F25
X501	2791501	CRYSTAL HC-49/U
	H310354	DIGITAL CONV. JIG SCREEN (50")
	H310356	DIGITAL CONV. JIG SCREEN (55")
	UE02541	LENS CRT CHASSIS B. ASS'Y (50FX18B/19K)
	UE02542	LENS CRT CHASSIS B. ASS'Y (55FX20B)

NOTES